American Aviation

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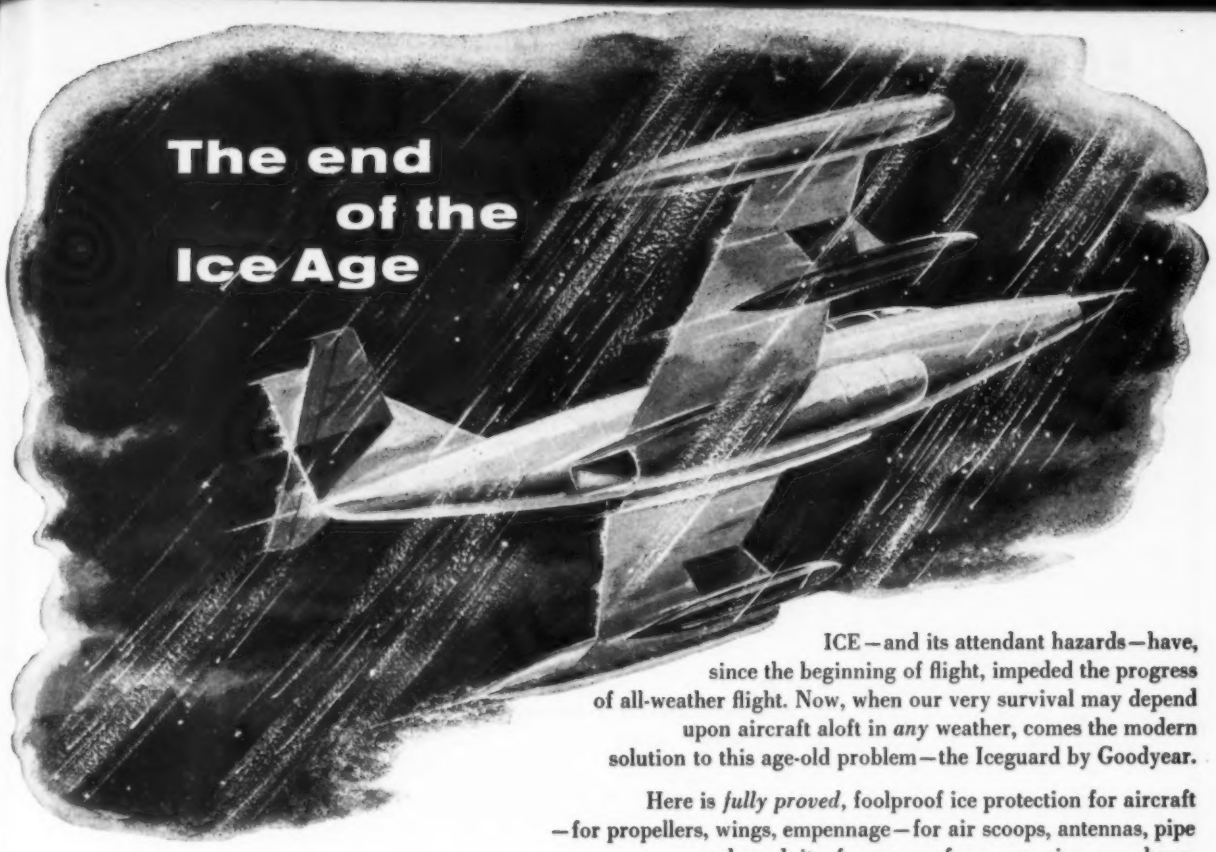

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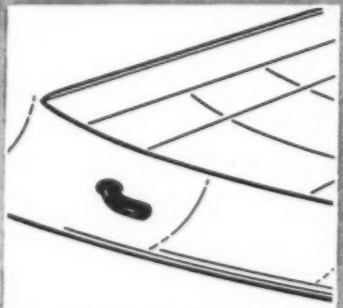

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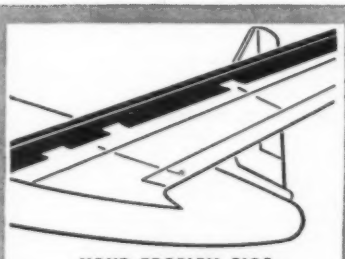

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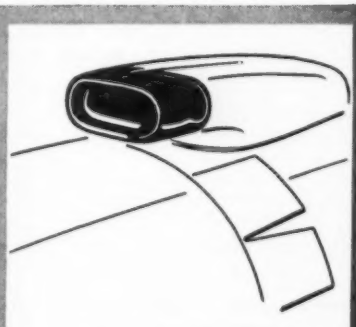

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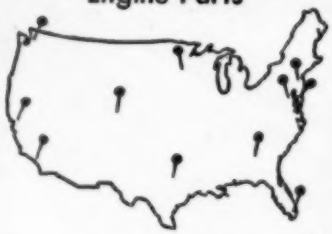

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Division of United Aircraft Corporation
East Hartford, Connecticut

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Voice of the Industry Since 1937

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BPA NBP

Contents

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VOL. 20 NO. 15

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INDUSTRY ROUNDUP

Why USAF Plans Cutback in Wing Strength 29
Northrop Jet Trainer to Replace Lockheed T-33 30
Rocket Society Hears Report on Latest Research Rockets 31
Army to Get Turbo Copter in 1959 32

FINANCIAL

Why Airline Stocks Fail to Attract Investors 35

PRODUCTION

Avro Cuts Costs with Plastic Tooling 39

ELECTRONICS

ICBM Program May Trigger New Technology 45

BUSINESS FLYING

Aircraft Products, Inc. Producing Tactair Autopilot 71
Long-Range Forecast of Aviation Needs Can't Be Precise 73

TRANSPORT

British Policies Imperil Independents 76
Heacock Move Splits Nonskeds 80
Carter Burgess, TWA's New President 84
What Russians Have Learned About Jet Transports 84
M & O Facilities Lagging In Russia 86

DEPARTMENTS

Personal View 9
Letters 11
Books 11
Washington Report 15
When & Where 17
News Digest 18
Production Spotlight 24
Airtrends 26
Sam Saint Says 42
New Products 54
West Coast Talk 65
International Aviation 68
Transport Trends 75
Airline Statistics 83
Airline Commentary 88
Contracts 92
En Route 94

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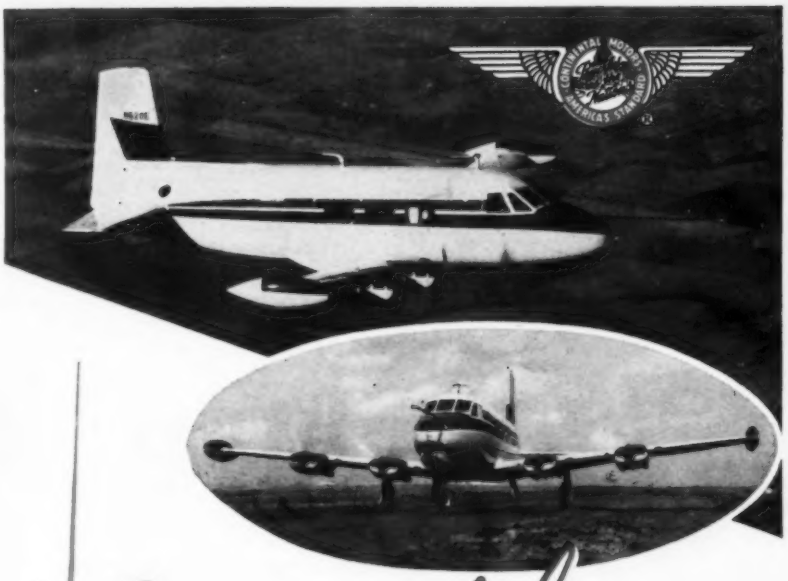

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And for the United States Air Force, a Lear L-10 autopilot in the Boeing KC-135 jet transport tanker will provide the rock-steady sureness of flight required for the most exacting of all aerial maneuvers: air-to-air refueling of a bomber at jet speeds. In automatic flight controls for the new military and airline jets, Lear is again first in concept, first in production... to meet tomorrow's precision needs of aviation today. LEAR INC., GRAND RAPIDS, MICHIGAN IP-11

Personal View

By WAYNE W. PARRISH

Abolish the "Numbers Game"

THIS BEING federal budget time, the traditional speculation concerning the planned and attained strength of the USAF is in progress.

There are clear indications that the present level of 137 wings, now to be achieved on schedule by end of the current fiscal year next June 30, will be trimmed down somewhat within the next few years.

But it will be a great mistake for press and politicians to take any such planned reduction as an evidence of the leveling off or reduction of the combat capability of USAF. It will be most unfortunate if future planning gets involved in another "numbers game" controversy.

The truth is that *combat capability,* which is the only real test of air strength, has been rising steadily and *will continue to rise* regardless of any shift in the number of wings. It would be helpful, although perhaps not possible to achieve, if the USAF could create a more realistic and accurate measurement of its actual strength than the numerical one of wings so often abused in the public prints.

USAF capability, actually, has zoomed upwards in all respects. A single wing of fighter-bombers today, equipped with nuclear weapons, could achieve what an entire Air Force required years to do in World War II or in Korea. And there is not the slightest intention or prospect that the continued increase of combat capability will be slackened.

Perhaps the Aviation Writers Association can aid in educating the daily press to the meaningless nature of wings as a measure of air strength. It's time the "numbers game" was relegated to its proper position in past history. USAF planning has never been better nor has USAF ever been in such an extremely powerful state of readiness.

Orchid to Durfee

A prize orchid goes to CAB Chairman James R. Durfee for arranging the visit of himself and three of his colleagues and fourteen CAB staff members to the west coast recently. Not only did this group of 18 fly on the Boeing 707 prototype jet transport from Seattle to Los Angeles, but they were briefed by Boeing, Lockheed, Douglas and Convair respectively on future aircraft planning. And at a breakfast given by Western Airlines, the group sat down for the first time in CAB history with a full airline staff to discuss industry problems.

This is common sense activity by the CAB. It can result in nothing but good. It will lead to a better understanding of industry problems. Hallelujah.

Couldn't Be Otherwise

Our congratulations to the Collier Trophy Award Committee for its selection of William M. Allen, his associates at Boeing Airplane Company; General Nathan F. Twining, and the USAF jointly to be the recipient of the 1956 award. The reason: The B-52, America's great achievement in a long-range bomber. It was the only choice possible.

Unfunny Story

Here's why regulations are created and here's why strict overall air traffic control is a necessity:

We were in a Northeast Airlines DC-3 recently. We had landed at Lawrence, Mass., and Capt. Bob Ward had taxied to the end of the runway for takeoff to Manchester, N. H.

Being in the front left seat we had a full view of what happened. A private airplane was coming in for a landing just as though our DC-3 wasn't on the runway. (There was no warmup or turning apron.) The private job kept on coming. Capt. Ward had no choice but to gun the engines and scoot off onto the turf with no time to spare. The private plane made a touch-down on the runway and took off again. Probably a local nut out for Saturday afternoon practicing without a care in his noggin.

As if this weren't enough, a second private plane followed along closely and came in for a landing. Here were two brazen violations in addition to two examples of poor judgment and absence of courtesy. If those two private pilots still have licenses they shouldn't have.

Looks Good to Us

The new director of public information for USAF, Brig. Gen. A. J. Kinney, represents a distinct change of pace from his predecessors. In a sense it might be said that no more unlikely a candidate for such a post could be found. He has had a fine record of active service and was executive assistant to Secretary of the Air Force Quarles for a year, but he has never had any public information or press relations experience heretofore.

But we are impressed by this change of pace. General Kinney is articulate. He is anxious to improve USAF relations with communications media. He has a very thorough knowledge and background of USAF policy. It all looks good to us.

Duke Ramsey

Admiral DeWitt C. Ramsey let it be known some time ago that because of poor health he would like to turn over the active helm at Aircraft Industries Association to someone else. He is to be succeeded early next year by General Orval Cook, USAF (Ret.), who has a high mark to shoot for. In the long history of AIA and its predecessor organization there has never been a more stable or more efficient operation of the trade body. Everyone will be sorry to see Duke Ramsey step down. He does so with a fine record behind him.

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Circle No. 5 on Reader Service Card.

Letters

Case for Micro Switch

To the Editor:

Your October 22, 1956, issue of AMERICAN AVIATION, on page 162, includes under Industry News Digest an item entitled "Malfunctioning Switches Caused Capital Mishap." Within the article reference is made to "microswitches" as the switches which malfunctioned, bringing about the mishap.

As you know, Micro Switch has been used by our company for many years as the name of our Division (of Minneapolis-Honeywell Regulator Co.), and likewise, Micro Switch is used to designate our product. Your use of the word "switches" within the title, which is correct, and your use of the term "microswitches" in the body of the article, may lead readers to feel that the switches that malfunctioned were Micro Switches and of our manufacture.

Actually, there were no products of our manufacture on the Viscount and the switches involved, as we understand it, were of an English manufacturer. . .

F. E. WILSEY
General Sales Manager
Micro Switch, Division of
Minneapolis-Honeywell
Regulator Co.

Freeport, Ill.

Editor's note: Reader Wilsey's point is well taken. No Micro Switches were involved. The term "microswitch" in the accident report was authored by CAB and not by AMERICAN AVIATION *nor by the manufacturer, a British firm.*

Sam Saint Fan Letter

To the Editor:

Please accept my personal congratulations on the addition of S. P. "Sam" Saint to your staff as contributing editor. I am sure that you will find Sam's contribution to the list of features carried in the American Aviation Publications will be one of the most popular features, once it is established.

We are looking forward to reading Mr. Saint's column with great pleasure, and promise to be one of his most avid fans.

LARRY CATES
Air Line Pilots Assn.

Washington, D. C.

Editor's note: Sam Saint's first contribution appears in this issue, page 42.

For the Birds

To the Editor:

You say birds are not known to fly above 8,000 ft. ("Strictly for the Birds: CAA Studies How to Safeguard Windshields on Jets," AMERICAN AVIATION, Nov. 5).

I narrowly missed 100 ducks over South Bend, Ind., at 14,000 on a CAVU day. Many of my airline friends have observed birds above the 8,000-ft. area.

VERNON M. BYRNE, Captain
American Airlines

Chicago, Ill.

Dissenting Opinion

To the Editor:

Anent your editorial "Two Films: One Down, One Up" of Dec. 3, 1956.

I say your editorial writer stubbed his toe in agreeing with his "incisive" Jack Gould, critic for the *New York Times*, who wants the Air Force to get out of show business and stay out. Pity the poor TV audiences if there were to be no more excellent shows like last month's "The Day North America is Attacked."

For you to say this wonderful film is "Down" because you think Generals Twining and Partridge were "strained, ill at ease" and you "cringe" over the "complicated intricacies of making telephone connections"—Man, you ought to apologize to the generals and then to your readers!

The actual appearance of the generals enhanced the movie far more than professional actors could have, and lent authenticity to an excellent production.

CARL A. SWANSON, JR.
Van Nuys Tower, CAA

Van Nuys, Calif

Editor's Note: Ouch!

Books

Viscous Flow Theory. *By Shih-I Pai. Published by D. Van Nostrand Co., Inc., Princeton, N. J. 400 pp. Illustrated. Price, $7.75.*

A study of laminar flow of viscous, compressible fluids with particular attention to aerodynamics, intended for research technicians, engineers and advanced students.

New Era of Flight. *By Lewis Zarem and Robert Maltby. Published by E. P. Dutton & Co., Inc., 300 Fourth Ave., New York 10, N. Y. 176 pp. Illustrated. Price, $3.75.*

A simplified picture story of aviation from the Wright Brothers' flight to the missile era for student air-age education. Contains basic information on flight instruments, radar and propulsion principles.

The Flying Years. *By Lou Reichers. Published by Henry Holt and Co., 383 Madison Ave., New York 17, N. Y. 384 pp. Illustrated. Price, $4.50.*

A personal account of World War II flying experiences of Col. L. T. Reichers while assigned to Air Transport Command from February 1941 to September 1945.

Operations Research, Armament, Launching. *Edited by Capt. Grayson Merrill, U.S.N. Published by D. Van Norstrand Co., Inc., Princeton, N. J. 528 pp. Price, $10.*

This is the third volume of a series titled *Principles of Guided Missile Design*, edited by Capt. Merrill. It describes how requirements of the armed services derive from legal roles and missions, tells how they develop missiles in cooperation with industry and details the technique of operations research as a basis for decision-making.

The section on armament tells how to design a missile warhead and fuse to destroy its target, while the section on launching treats the booster assemblies, catapults and airborne and surface launchers.

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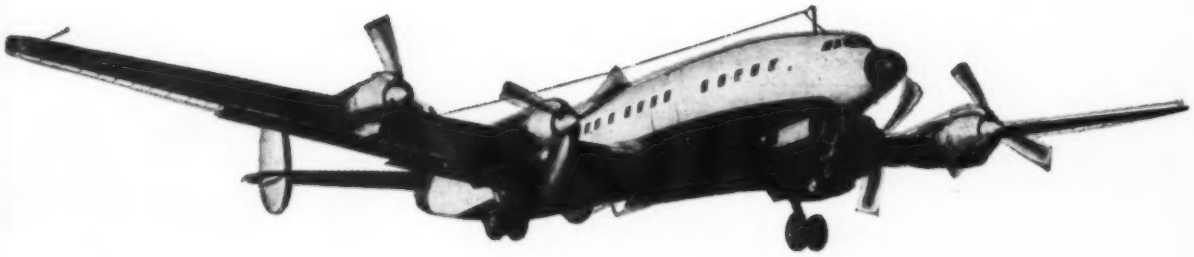

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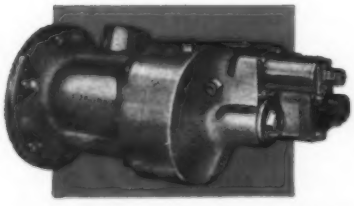
is there—when a new star is born . . . with advanced engineering to provide the extras that keep pace with tomorrow's targets in performance. The new Lockheed 1649-A . . . faster . . . smoother . . . quieter, looks to STRATOPOWER Pumps for the actuation of brakes, landing gear, elevators, rudder and wing flaps.



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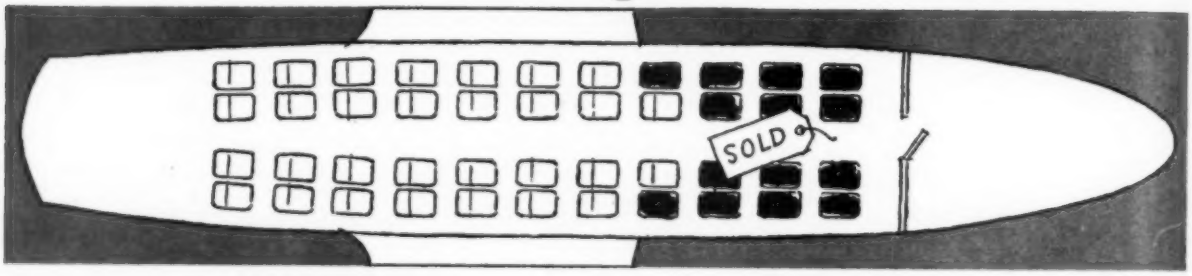
Circle No. 7 on Reader Service Card.

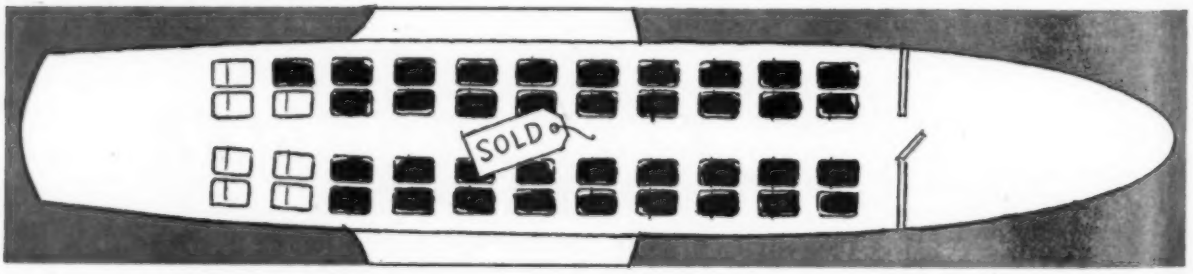
THE ECONOMICAL VICKERS VISCOUNT

How famed turbo-prop aircraft are working for TCA



LOWEST break-even "load factor"

TCA has found the break-even load factor with the turbo-prop Vickers Viscount to be the lowest of any aircraft they use:—29.5%. By selling *14 seats* on each flight, TCA can cover all direct costs of their Viscount operation (excluding overhead)—such as fuel, oil, insurance, flight-crew salaries and expenses, maintenance, labor and material including depreciation.



HIGHEST average "seats sold"

Trans-Canada Air Lines' Viscounts have met with unprecedented passenger approval. As a result, passenger traffic has soared . . . and the average passenger load factor on TCA Viscounts in the first months of 1956 was a remarkable 84% or . . . 37 out of 44 seats sold.

TCA reports the Vickers Viscount is its "most economical aircraft." The combination of this *low* break-even load factor (based on direct costs) and *high* actual "seats sold" average has made the Viscount a resounding success in TCA operation. TCA's experience with the turbo-prop Vickers Viscount is typical of dozens of other airlines throughout the world. *United States Sales Representative: Christopher Clarkson, 10 Rockefeller Plaza, N. Y.*

turbo-prop VICKERS VISCOUNT

POWERED BY FOUR ROLLS-ROYCE DART ENGINES

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Washington Report

$40-Billion Defense Budget ?

Fiscal 1958 Defense budget request may be nearer $40 billion than the predicted $38 billion.

Defense Secretary Wilson says only that the request will be higher than fiscal 1957's $36.3 billion.

However, some Pentagon sources believe the request may go as high as $40 billion because the Administration must have funds for accelerated research and development.

A clue is found in a recent Wilson statement that the biggest problem in the budget decision is not world events but "assessing the relative value of new developments and new weapons." Further evidence is found in reports that:

• A new policy may be forthcoming on fighter-bombers. Although a competition was called off because of lack of funds, the production future of the Republic F-105 and North American F-107 will be decided early next year. The F-107 has not been ordered into production because of funding, but this may change.

• Tactical Air Command will need a supersonic replacement for the Martin B-57 and Douglas B-66. Martin's XB-68 was launched for the purpose, but more funds will be needed.

• Speedup has been ordered on research for chemical and nuclear-powered bombers to provide Strategic Air Command with an ultimate manned aircraft to handle long-range bombing missions. Only bomber SAC has that can fly a 5,000-mile mission and return is the B-36. Convair B-58 will require in-flight refueling. But simultaneous with increased emphasis on the "exotic fueled" bombers, the B-58 program may be stepped up out of part of the $900 million provided by Congress for SAC aerial weapons.

• Change in missile assignments by Wilson's "clarification" memo calls for change in funding, more speed in applying technology to long-range ballistics missiles.

U. S. Bank Aids Jet Buyers

Export-Import Bank of Washington is making it easier for foreign airlines to buy U.S. jet equipment. Bank has agreed to purchase Japan Air Lines notes totaling $16.5 million from Douglas Aircraft in connection with JAL's $29-million order for four DC-8s.

Bank's credit is for a period of seven years, repayable in semi-annual installments starting 1961. This is a new policy. Previously, credit for piston-powered aircraft was five years.

Eximbank has under consideration a recent staff study on jet financing, may take the lead in aiding other foreign airlines make decisions in favor of U.S. jets.

Since 1945, the bank has authorized more than $114 million in credits to assist overseas buyers in 11 countries in financing purchase of U.S. civil transports. It granted JAL $7.7 million credit on four DC-7Cs, which cost a total of $13.5 million.

Both credits to JAL stipulated initial down payment of 25% of purchase price by the airline and 25% participation by Douglas. Bank carries the remainder through purchase of JAL notes.

New Fodder for Congress

There will be some congressional interest in why there was no government answer to a November bid by U.S. nonscheduled airlines to move 1,000 Hungarian refugees a day to this country.

The bid was made through Aircoach Transport Assn. to Tracy Voorhees, coordinator of the Hungarian refugee movement. ACTA said it could provide 500 seats a day, that "other independents" could provide an additional 500. Total charge per refugee carried would be about $200, with Austria as takeoff country.

The offer was ignored. ACTA expects Congress to ask why. The group also wants to know why the airlift was turned over to Military Air Transport Service, when that organization has to operate out of Germany instead of Austria and is about twice as expensive per refugee carried as the nonsked proposal.

Finis for Aircraft Show

Annual National Aircraft Show appears to be a thing of the past, with military services and industry vetoing further participation.

Aircraft Industries Assn. public relations committee continues its recommendation that AIA take no part in any air show, is strongly critical of annual Labor Day event.

AF Secretary Donald Quarles says USAF no longer is interested. Army and Navy will go along.

Outlook: Other national events, such as Armed Forces Day, will get nod for future airpower displays.

Durfee Comes Out for Adams

Any doubt CAB Chairman James R. Durfee is supporting reappointment of Vice Chairman Joseph P. Adams to the Board was dispelled by Durfee himself.

Introducing Adams at a recent Washington social gathering, Durfee referred to the support Adams has received and said he called attention of such support to Presidential Assistant Sherman Adams, key figure in White House appointments.

Durfee thus joined his predecessor in backing the Seattle Democrat. Former Board Chairman Ross Rizley, now a federal judge in Oklahoma, earlier had told the White House he favored Adams.

Both Durfee and Rizley consider Adams has been an influential link in recent years between them as Republicans and the Democratic-controlled Congresses—particularly since Adams' No. 1 supporter, Sen. Warren G. Magnuson, is chairman of the powerful Senate Interstate & Foreign Commerce Committee.

Jets to Boost CAB Costs

Civil Aeronautics Board is going to start switching to the era of jet transportation to the tune of about $1 million next year.

Board's fiscal 1958 budget request, understood to have White House approval, probably will be for about $5.5 million, against $4.5 million authorized this year.

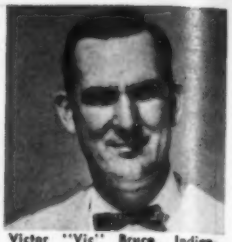
CAB Chairman Durfee has told the press jet aircraft will introduce revolutionary problems and responsibilities in the formulation of rules governing air safety. He also indicated a substantial expansion of the Board's safety regulation activities is programmed under the increased budget next year.

Don Vest, Vest Aircraft & Finance Co., P O. Box 5306, Sky Ranch Airport, Denver, Colorado.

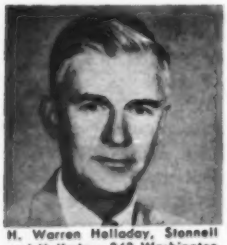
Gene Hudman, Stonnell and Holladay Aircraft Sales, Carolina Division, Municipal Airport, Charlotte, North Carolina.

Peter Graves, Southern Ohio Aviation Sales Co., Dayton Municipal Airport, Vandalia, Ohio.

John Wilsdon, Hunter Aviation Co., P O. Box 122 Lambert Field, St Louis, Missouri



Victor "Vic" Bruce, Indianapolis Executive Aircraft Corp., Indianapolis Municipal Airport, Indianapolis, Indiana.

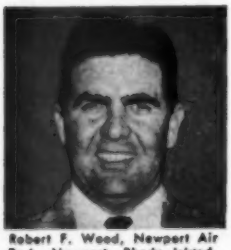


H. Warren Holladay, Stonnell and Holladay, 843 Washington Building, Arlington Towers, Arlington, Virginia.

A. M. "Sime" Bertolet, Reading Aviation Service, Inc., Municipal Airport, Reading, Pennsylvania.

H. Leibee Wheeler, Buffalo Aeronautical Corporation, Buffalo Municipal Airport, Buffalo, New York.

John S. Brown, Brown Aero Corp., 3300 Love Field Drive, Dallas, Texas



Robert F. Wood, Newport Air Park, Newport, Rhode Island.

Wynn Cronin Minnesota Air motive Inc. Minneapolis-St. Paul International Airport, Minneapolis Minnesota

Norman Hoffman, West Texas Flying Service, Midland Airport, Box 82, Midland, Texas.

Max R. Brand, Aero Commander Dist. (Downtown Airpark), Hanger 3, Municipal Airport, Tulsa, Oklahoma.

E. H. "Ted" Tolan, National Aero Sales Corp., Midway Airport, Chicago, Illinois.

W. D. Maddox, Aero Southern Corp., 601 North Broadway, Nashville, Tennessee.

W. H. "Bill" Buchanan, Sales Manager, Johnson Air Interests, Inc., Herlick-Racine Airport, Racine, Wisconsin.

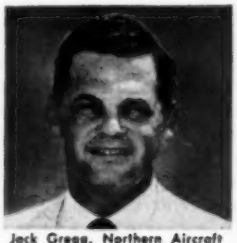
Louis Humphreville, Executive Aircraft Corporation, Municipal Airport, Pontiac, Michigan.

Jack Hale, Chamberlain Aviation, Inc., Akron Municipal Airport, Akron, Ohio.

John A. "Jack" Bauman, Santa Monica Aviation, 3011 Airport Avenue, Municipal Airport, Santa Monica, California.

Herrel Bellamy, L. B. Smith Aircraft Corp., Miami International Airport, Miami, Florida.

Lucien M. Taillac, Trans-Aire Corporation, Pan-Air Building, New Orleans Airport, New Orleans, Louisiana.



Jack Gregg, Northern Aircraft Co., International Terminal Building, International Airport, Oakland, California.

Robert M. Brown, Commander Sales Company, Terminal Building, International Airport, San Antonio, Texas.

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DECEMBER

Kitty Hawk Day celebration, Kitty Hawk, N. C., Dec. 17.

Wright Memorial Dinner, Sheraton-Park Hotel, Washington, D. C., Dec. 17.

JANUARY

Miami-Havana Air Cruise, 15th annual, Jan. 8-10.

National Symposium on Reliability and Quality Control in Electronics, sponsored by IRE, AIEE, RETMA and ASQC, Hotel Statler, Washington, D. C., Jan. 14-15.

SAE Annual Meeting and Engineering Display, Sheraton-Cadillac and Statler Hotels, Detroit, Jan. 14-18.

Plant Maintenance Show, eighth annual, Public Auditorium, Cleveland, Jan. 28-31.

Institute of the Aeronautical Sciences, 25th annual meeting, Sheraton Astor Hotel, New York City, Jan. 28-Feb. 1.

Agricultural Aircraft Assn., annual convention, Senator Hotel, Sacramento, Calif., Jan. 31-Feb. 2.

FEBRUARY

Instrument Society of America, Aeronautical Div. of New York Section annual mid-winter conference, Garden City Hotel, Garden City, L. I., Feb. 7.

Annual Jet Age Conference, sponsored by Air Force Assn., Sheraton-Park Hotel, Washington, D. C., Feb. 14-15.

Western Joint Computer Conference, sponsored by IRE, AIEE and ACM, Hotel Statler, Los Angeles, Feb. 26-28.

MARCH

National Conference on Aviation Education, sponsored by National Aviation Education Council, Mayflower Hotel, Washington, D. C., Mar. 7-9.

Nuclear Congress & International Atomic Exposition, Convention Hall, Philadelphia, Mar. 11-15.

IAS Flight Propulsion Meeting (classified), Hotel Carter, Cleveland, Mar. 14-15.

American Society of Tool Engineers, Silver Anniversary meeting, Shamrock Hilton Hotel, Houston, Tex., Mar. 25-27.

APRIL

SAE Aeronautic Meeting and Production Forum, Hotel Commodore, New York City, Apr. 2-5.

IRE Professional Group on Telemetry and Remote Control, national symposium, Philadelphia, Apr. 15-17.

Airport Operators Council, Conrad Hilton Hotel, Chicago, Apr. 28-May 2.

MAY

Aero Medical Assn., 28th annual meeting, Shirley Savoy Hotel, Denver, May 6-8.

American Helicopter Society, annual forum, Sheraton-Park Hotel, Washington, D. C. May 8-11.

Aviation Writers Assn., annual convention, Chase and Park-Plaza Hotels, St. Louis, May 26-June 2.

National Telemetering Conference, Hotel Cortez, El Paso, Tex., May 27-29.

JUNE

National Aviation Trades Show, Monmouth County Airport, N. J., June 7-9.

Pan American to use SKYDROL in first U. S. jet liners

twenty-five long-ranged Douglas DC-8s,
powered by P&W JT-4 engines, will be
delivered to PAA starting in December 1959.
PAA
PAA AMERICAN PAPER AIRWAYS
PAA
Pan American's twenty Boeing 707
uled for delivery beginning in Dec
1958, will include 12 JT-4 power
continental" versions.

Typical flight times for both the Douglas DC-8 and the Boeing "Intercontinental" will be New York-London in 6 hours, 15 minutes; Tokyo-Seattle in 8 hours, 32 minutes.

Pan American's mammoth order for 25 Douglas and 20 Boeing commercial jets is the largest aircraft order ever placed by a private company . . . the first firm purchase of jets ever made by a U. S. airline. And Pan American recognizes that the jet age is also an age of high-performing synthetic lubricants. The company has specified fire-resistant Skydrol fluids to be used in the hydraulic systems of both types of aircraft.

Skydrol fluids offer safety, higher lubricity than petroleum fluids, which means longer pump life, less maintenance and greater operating economy. Whatever your hydraulic fluid needs, there's a Skydrol "tailored" for the job—in jets as well as piston engine aircraft! For more information, write Organic Chemicals Division, MONSANTO CHEMICAL COMPANY, Dept. SKD-8, St. Louis 1, Missouri.

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34 MAJOR AIR CARRIERS NOW USING SKYDROL

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CANADIAN PACIFIC	UNITED	ARAMCO
NORTH AMERICAN AIRCOACH	DELTA	U.S.A.F.
	SLICK	B.O.A.C.
TRANS-CARIBBEAN	JAL	NORTHWEST
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Industry News Digest

Wilson's Single-Management Concept Arouses Resentment of Services

Defense Secretary Charles Wilson would hardly win a popularity contest among the armed services for his determination to implement the single-management concept wherever possible.

The services, jealous of individual prerogatives and missions, are finding recent directives hard to swallow and are using every resource available—arguments, statistics and loopholes—to stave off or delay implementation. Two recent projects have, in one case, aroused Navy ire and, in the other, Air Force—both are in the transportation area.

• **A draft directive** was recently circulated to the services for comments and arguments on transferring about 200 Navy transports in the Fleet Logistic Air Wing to the Air Force's Military Air Transport Service. While observers predict the draft directive will be put in force, the Navy has asked for a time extension to present further arguments to show need for retaining FLOGAIR.

• **Creation** of the Military Traffic Management Agency early in the fall to handle all commercial transportation for all services in Continental U.S. has aroused Air Force antagonism. MTMA, scheduled to be in full operation by next summer, is under Army jurisdiction. It has already taken charge of transportation for 15 or more personnel.

MTMA's power, however, extends to cargo and freight movements also. Air Force's Air Materiel Command has been the contracting agency on cargo lifts and is fighting hard to retain the function. Airlift contracts with AMC run through next June and MTMA expects to conduct the renegotiations, but apparently so does AMC. A planning group has been established within the new agency to draw up terms of reference and is composed of representatives from each service.

The freight and cargo issue is being thrashed out at this time, and the possibilities of a compromise are foreseen since MTMA does have the power to delegate. There are possibilities "a bargain" on the cargo lift in the U.S. may be achieved, but MTMA's directive calls for it to participate in contract renegotiation.

• **Under terms** of the agency's function, each service must supply MTMA with its requirements, what is to be moved, where and when it is to be moved. But how it will be moved will be decided by MTMA. This will also extend to the moving of materiel from factory to point of destination in continental U.S.

Air transportation will be considered along with rail and other surface media. Form of transportation will be decided basically on two points: (1) commodity priority and type; (2) maintaining a healthy transportation structure. Regional offices are being established and are scheduled to be functioning in April.

While MTMA is responsible for continental U.S., the Defense Department has under active consideration the same single-management concept for military transportation on a world-wide basis. If effected, MATS' operation of contracting commercial will funnel into a similar consolidated agency. However, in a recent maneuver, AMC was given cognizance over the overseas transportation contracts as well as stateside.

In the overall picture, the individual services are playing a waiting game. Increasing rumors of Wilson's resignation are bringing out some fancy footwork to stall off implementation of the single-management concept directives. Services seem to feel if they can delay long enough, Wilson may be gone and a new look achieved.

French Plane Features Boundary Layer Control

Designed by ONERA (France's NACA) and built by Ouest-Aviation, the Deltaviex experimental aircraft features boundary layer control on inner sections of its 6% thick delta wing. Powerplant is a Turbomeca Marbore. Ventral fin beneath tail is one of several unusual features of the Deltaviex.

Air Associates Plans Florida Headquarters

Air Associates, Inc., has disclosed plans to move its headquarters from Teterboro, N. J. to a new 200,000-sq.-ft. plant located on Pinellas County Airport, St. Petersburg, Fla.

President Frank W. Godsey, announcing the appointment of Lorian W. Willey as Air Associates v.p., termed Willey's addition a further move to strengthen the company's top management prior to the projected transfer to the St. Petersburg site.

The Florida plant, due to be completed in the summer of 1957, will start operations as Electronics Communications, Inc., a wholly-owned Air Associates subsidiary. Complete shift of company activities to St. Petersburg presumably will take place within the next year.

Northrop, Vertol Draft Merger Agreement

Merger agreement between Northrop and Vertol is being drafted and will be submitted for ratification by the boards of directors following resolution of "certain matters" yet to be worked out.

Ratification and presentation of the plan to stockholders for final approval will probably take place about April.

Plan calls for exchange of two shares of Northrop common stock for one of Vertol. Merged company would have over $85 million total assets and $430 million annual sales.

Boeing B-52 Wins Collier Trophy Awards

The Boeing B-52 Stratofortress won the Collier Trophy for Boeing Airplane Co., its president, William M. Allen, the U.S. Air Force, and Gen. Nathan F. Twining. Recipients were announced by National Aeronautic Assn., which administers the award.

Boeing and Allen were cited for the "conception, development and quantity production of America's first all-jet long-range bomber," and USAF and Twining for sponsoring and making the plane operational in 1955 as a "powerful weapon of peace."

Gen. McNarney Indicates He'll Retire in April

Gen. Joseph T. McNarney, USAF (Ret.) will not seek renewal of his contract as president of Convair when it expires April 1, 1957. He has indicated to friends a desire to take things easier. A General Dynamics official said, however, that he would be urged to renew the contract.

McNarney told a Congressional committee last spring that his five-year contract (from April 1, 1952) with Convair called for a 10-year term as consultant at $30,000 a year after his formal retirement. He will also continue as a director.

Curtiss-Wright Sues ACF Industries

Curtiss-Wright Corp. filed suit in U.S. District Court for the District of Maryland against ACF Industries Inc., Erco Division, "to prevent threatened patent infringement."

C-W said the suit resulted from the offer for sale by Erco of flight simulators and other light training equipment covered by patents it owns or controls.

This is the second suit by C-W on the simulator patent issue. Still pending in court is the suit filed last December against Link Aviation Inc., reportedly for sale of a Model E-600 trainer to Flight Safety Inc., New York.

C&O Railway Plans To Invest in Slick

Chesapeake & Ohio Railway plans to become the first railroad in recent years to invest in an airline.

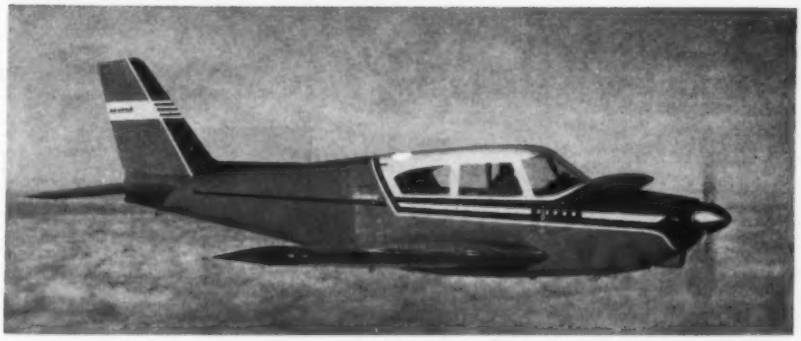
It is taking $3,333,000 of a $5-million 10-year convertible debenture issue planned by Slick Airways next month. Debentures are convertible, after Jan. 1, 1959, into stock of the all-freight carrier at a conversion price of $6.50 a share. The remaining $1,667,000 of the new issue is to be acquired by Earl F. Slick and other members of the Slick family.

Attorneys for C&O and Slick said the C&O's move is not subject to approval of the Civil Aeronautics Board because the question of control of the airline is not involved.

Slick now has 850,000 common shares outstanding, with the Slick family as the "largest single holder." The debenture issue will not disturb present control of the company, Slick spokesmen said. New stock will be issued to meet the debenture conversion.

Straight division of the conversion price into total debentures to be bought by C&O would give the railroad 512,769 shares of Slick, after and assuming full conversion.

Piper All-Metal Comanche



First flight picture of Piper's new all-metal high-performance Comanche (AMERICAN AVIATION, Dec. 3). Features include laminar-flow wing, swept rudder and "flying tail" which combines stabilizer and elevator in a single assembly. Plane shown is Comanche No. 2, which was built with the first prototype, and is now undergoing instensive flight testing at the company's Lock Haven, Pa., plant.

WAL Accuses CAB Of 'Fishing Expedition'

Western Air Lines has accused the Civil Aeronautics Board staff of engaging in a "general fishing expedition" in the General Passenger Fare Investigation and has urged CAB to quash a subpoena which seeks production of WAL's confidential financial information.

Subpoena was issued by Examiner Ralph L. Wiser on November 27, at the request of CAB Bureau Counsel. Specifically, it seeks production by WAL of "all studies, analyses and other documents submitted by Western . . . to financial institutions in support of standby loan agreements or loan committments entered into by Western . . . since January 1, 1955, relative to future funds."

Terming the matter sought by the subpoena to be "highly confidential," WAL said the action constitutes an "unreasonable search and seizure in violation of the Federal Constitution."

CAB Unit Would Ease Shift to Turboprops

CAB Bureau of Safety Regulation has issued a proposed rule which, if adopted, would streamline the certification of piston-to-turboprop transport conversions.

Board's proposal, designed to "encourage modernization of transport category aircraft," would permit the switch to turboprops without complying with all of the requirements of a new aircraft type certificate. It would apply to such types as Convairs, DC-6s and Constellations for which type certification was requested before current rules were adopted.

Under CAB's plan, a special regulation would permit changeover to turboprops under rules in effect at the time their initial certification was applied for, plus certain special conditions set down by the Board. These conditions would include performance requirements that apply to turbine aircraft, turboprop powerplant installation provisions, cockpit control and instrument standardization rules in CAR 4b.

ATA Absorbs Airlines Personnel Conference

The Airlines Personnel Relations Conference, a separate industry organization that has worked on non-competitive personnel and industrial relations problems for the carriers, has become a part of the Air Transport Assn.

J. L. O'Brien, who headed APRA as executive director, was elected a vice president of ATA during the association's meetings of directors and membership this month.

ATA also changed its dues formula to make it possible for all-cargo lines to become full members instead of associates. The board of directors was increased from 11 to 12 members to pro-

(*Continued on page* 22)

ICBM

"LIFE INSURANCE" The preservation of the peace and security of this nation depends upon two things: Our diplomatic wisdom in a troubled world, and the power to protect ourselves if peaceful negotiation should fail.

Point 2 is part of *our* responsibility. This is the Martin-U.S. Air Force TITAN program... one of the most advanced and critically important development projects in America today... an Inter-Continental Ballistic Missile conceived in peace and dedicated to the proposition that no aggressor shall ever take the life of this country.

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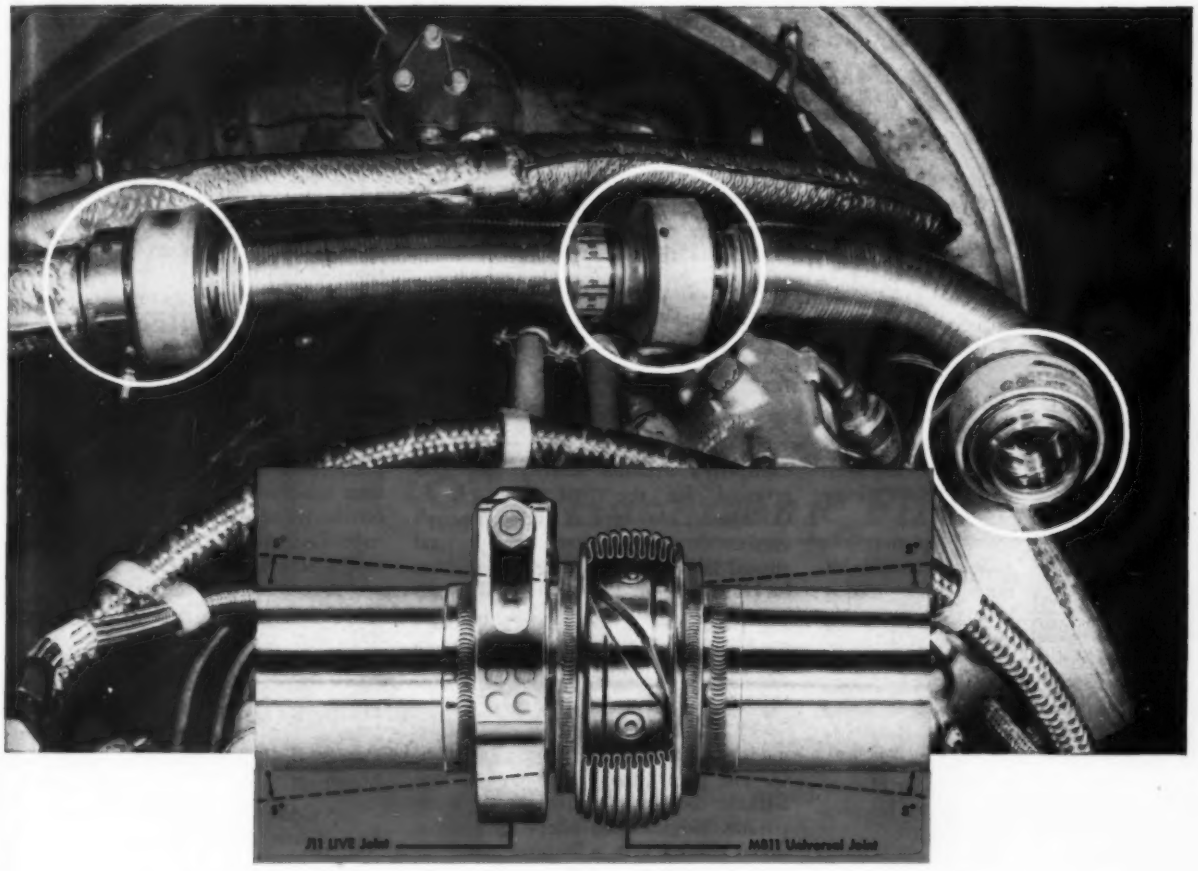

New Marman MB11 Universal Joint

The new Marman MB11 Universal Joint is designed to meet severe flexing and vibration characteristics of supersonic aircraft ducting systems. It is capable of handling high volume of gases from —300° F. to +800° F. with minimum pressure drop at deflection angles up to 10°.

The bellows is protected from torque and end load and is designed to withstand resonance associated with high velocity gas flow. All internal parts are constructed of high temperature corrosion-resistant materials.

The MB11 Joint can be furnished in 2″ and 3″ sizes, as an integral part of the ducting or with Marman J11 series LIVE Joints for convenient disassembly.

Write for complete information.

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MARMAN PRODUCTS ARE MANUFACTURED UNDER VARIOUS U.S., CANADIAN AND FOREIGN PATENTS AND OTHER PATENTS PENDING

Industry News Digest

(*Continued from page* 19)

vide representation for the cargo carriers, and Robert W. Prescott, president of The Flying Tiger Line, was named to fill the directorship for the coming year.

Four cargo lines are now full members: Slick, Tigers, AAIXCO and Seaboard & Western. Riddle elected to remain as associate member.

In another action, the ATA board voted funds to accelerate the association's study of air traffic control delays.

Paul Goldsborough Takes Pentagon Post

Paul Goldsborough will retire Jan. 1 as general communications manager for Trans World Airlines and will become staff director for communications in the office of the Assistant Secretary of Defense (Supply and Logistics). The Pentagon post, which he takes over on Jan. 3, has been vacant for some time.

GOLDSBOROUGH

A pioneer in airline communications and widely known in the industry, Goldsborough served as president of Aeronautical Radio Inc., wholly-owned airline subsidiary, from 1930 to 1942. After serving four years with the Navy, retiring with the rank of captain, he joined TWA in 1946 as director of communications. He was named to his present position three years later.

Goldsborough was a director of Arinc and a member of IATA's technical committee from 1946 to 1954. He had also served as a board member of International Air Radio, London, and Societe Internationale Telecommunications Assn., Paris.

Nyrop Confirms NWA Purchase of P&W J75s

Northwest Airlines earlier this year ordered 21 Pratt & Whitney J75 engines, although it has not yet indicated which jet transport it will buy. NWA president D. W. Nyrop confirmed that the order was placed after notice from P&W of a planned price increase on the engines. It is understood that P&W subsequently increased the price 10%.

Purchase of spare engines before final selection of its jet transport obviously gave NWA additional time to weigh its choice of the Boeing 707 versus Douglas DC-8 without incurring the engine price penalty. Final selection is now believed to be only one or two months away.

EAL Leases 12 Connies For Winter Traffic

Eastern Air Lines has leased six Lockheed Constellations from Seaboard & Western Airlines and six from TWA for its heavy winter traffic season.

CAB quickly approved the S&W lease, but did not act immediately on the TWA deal. The six planes to be leased by S&W will include the five 1049Hs now on order, plus one of the company's present fleet of five Connies (one 1049E and four 1049Ds converted for passenger use). S&W initially will lease EAL some of its present equipment, later replacing it with the new 1049Hs as the are delivered. Planes will carry 99 passengers. Lease will expire June 15, 1957.

News Briefs

MANUFACTURING-MILITARY

• **The size** of Hughes Aircraft Company's aviation activity has been revealed for the first time. J. S. O'Flaherty, manager of the company's semi-conductor division, placed total annual sales at $300 million and current backlog at more than $500 million.

• **Douglas Aircraft Co.'s** DC-6/7 production is now up to 12 planes a month and will reach 15 by next spring.

• **The North American** FJ-4B Fury made its first flight at Port Columbus, O. The plane is equipped with a low-altitude bombing system and incorporates longitudinal, lateral and directional control system improvements for very low altitude work at high speed. Service ceiling is more than 45,000 ft., speed more than 690 mph. Engine is a 7,800-pound-thrust Curtiss-Wright J65. The plane will soon be in production at Columbus for Navy attack squadrons.

• **A $300,000 suit** filed against Spartan Aircraft Co. charges "careless and negligent" engine overhaul. The suit, filed by widows of two Miller Brewing Co. pilots killed in a Lockheed Ventura crash at Milwaukee in 1954, charges the accident was caused by engine failure and that Spartan had certified the aircraft as airworthy four months before the accident.

• **Navy will install** British Martin-Baker "ground level" ejection seats in all present and future naval aircraft, as part of its low-altitude escape program. It contracted with Grumman Aircraft & Engineering Co. to install 100 of the seats in 50 F9F-T8s. Other contractors have been requested to submit proposals on similar installations to include re-engineering of present equipment.

• **Taloa Academy of Aeronautics,** division of Transocean Air Lines, received an Army contract to train 108 commissioned aviators of the 6th Army in instrument flying.

• **United Aircraft Corp.** increased salaries of 16,000 salaried employes by 5%. Increase amounts to about $4.5 million annually.

• **Fairchild Engine Division** of Fairchild Engine & Airplane Corp. received more than $8 million in new propulsion research and production orders for turbojet engines. More than $4.6 million applies to a new USAF jet engine development project, presumably the J83. More than $3 million are Navy orders for midget J44 jet engines and model refinement.

TRANSPORT

• CAB Examiner William J. Madden recommended certification of TWA and Pan American World Airways for polar route operations between the U.S. west coast and Europe. The companies' certificates would be amended to designate Los Angeles and San Francisco as "a separate group of co-terminals" on a permanent basis. Also, Seattle would be included in PAA's certificate until July 4, 1959.

• **Allegheny Airlines** is negotiating with Pioneer Aeronautical Services, Dallas, for purchase of an additional Martin 202 and for an option on two more. Company now operates five Martins.

• **CAB awarded** Lake Central Airlines a new route segment from Lima, O., to Detroit via Toledo. Grant is good for three years or until 60 days after completion of the Great Lakes Local Service Case. Application of North Central Airlines for the route was denied.

• **U.S.-Dutch negotiations** on a civil air agreement are scheduled to resume in Washington on Mar. 18.

• **CAB extended** for one year from Dec. 1 the exemptions under which certificated and non-scheduled airlines engage in military charter operations.

• **Contracts totaling $7.6** million were awarded to six airlines for airlift for Military Air Transport Service in the first half of 1957. Capitol Airways and Slick Airways received Atlantic contracts calling for carriage of 2,000 passengers between U.S. and Europe. Transocean, Resort and Overseas National have contracts calling for minimum airlift of 350 tons of cargo between Travis AFB and Tokyo. Pacific inter-island contract, for 125,000 plane miles of DC-4 operation, went to World Airways.

Beyond the Speed of Sound in a Split Second

Aerophysics HTV Rocket

probes the temperatures of Hypersonic Flight

Only speeds many times that of sound can supply the answers to today's vital questions about the "thermal thicket" where ordinary aircraft metals blister and disintegrate and ordinary windshields turn to liquid glass. These are the speeds of the future – not only for missiles, but for military and civil aircraft as well.

Curtiss-Wright's subsidiary, Aerophysics Development Corporation – working with the Wright Air Development Center of the U.S.A.F. Air Research and Development Command – has provided an ideal tool for this research in the just-announced HTV Hypersonic Test Vehicle. Reaching several times the speed of sound in only two seconds, this two-stage, ten-foot missile is topped with a two-foot nose cone where data on heat and air pressure are recorded.

The HTV is only the first in a family of such rockets on which Curtiss-Wright task scientists are at work. It is a dramatic example of Curtiss-Wright's developmental leadership in every advanced category of airpower.

AEROPHYSICS DEVELOPMENT CORPORATION
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ARMY FEELS IT MAY BE BETTER OFF aviationwise under Defense Secretary Wilson's "clarification" of roles and missions than it was before. Although Army lost long-range ballistic missiles (it's restricted to 200-mile weapons), it seems to have won a long-sought goal; a better chance to develop and use fixed-wing aircraft in excess of the 5,000-lb. limitation on empty weight.

It's too early to say definitely that Army will be allowed an exception for a high-performance observation aircraft, but officers are decidedly optimistic. Weight would be about 9,000 lbs. empty. Army's big talking point in trying to get Wilson's approval: USAF may have plenty of high-performance jets capable of photo reconnaissance and visual observation missions, but they can't operate in and out of short, rough fields. That would be one of the strong points of the Army-Marine Corps observation plane.

●

ANNOUNCEMENT OF CUTBACK IN USAF WINGS, presumably to be made at budget time (see page 29), may collide with the report of the Symington airpower subcommittee, expected early next year. Repercussions will depend on the extent of the Defense-recommended cutback. Tactical Air Command and Troop Carrier Command expect cuts. Reasoning is that they can get along with less wings because of larger, longer-range aircraft now available. Most observers say Symington report wil recommend increases, particularly in Strategic Air Command. One Democrat, Sen. Dennis Chavez of New Mexico, has already indicated that he'll oppose any move to reduce USAF wings.

Defense Dept. may try to offset criticism by pointing out that it's programmed the additional $900 million voted by Congress for fiscal 1957 for more B-52's and similar SAC "aerial weapons." Wilson opposed the increase, but USAF is using the funds. B-52 and KC-135 programming has been accelerated; part of the money may be used to speed up the XB-58 supersonic bomber project.

●

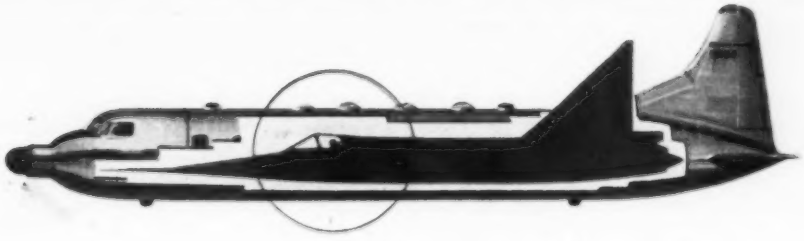
USAF HAS STARTED a detailed technical evaluation of the merits of the Thor and Jupiter ballistic missiles. Purpose: to determine how much of the latter project should be continued. Target date for recommendations: Feb. 1.

●

JOINT NEGOTIATIONS with aircraft and missile firms on wages may be sought by two AFL-CIO unions. IAM and UAW have formed a joint standing committee "to unify and strengthen" efforts on behalf of over three-quarters of a million employes in these industries. This means a more solid labor front in aircraft and missiles. And there'll be a strong drive to organize non-union plants.

●

825,000 WORKERS were employed by the aircraft industry in September, a new peacetime peak. In the same month, automobile workers numbered only 643,900. Highest weekly wage in aircraft industry was $99.10 paid to workers in aircraft engines and parts. Employes in other categories averaged over $97.



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Installed inside a Convair T-29 is an actual cockpit of Convair's delta-wing F-102A all-weather interceptor. Once aloft, the "back seat" pilot flies the T-29 by performing all the functions of a F-102A interceptor pilot. At the same time, scientists and engineers evaluate system performance and a psychologist checks pilot reaction. This use of the T-29 as a flying laboratory by Hughes Aircraft Company, Culver City, California, flight tests the F-102A's advanced electronic weapon system with far more efficiency than ever before – and at a fraction of the cost.

A "plane within a plane"–and both Convairs! Another dramatic example of **Engineering to the Nth power** working for the defense of our country!

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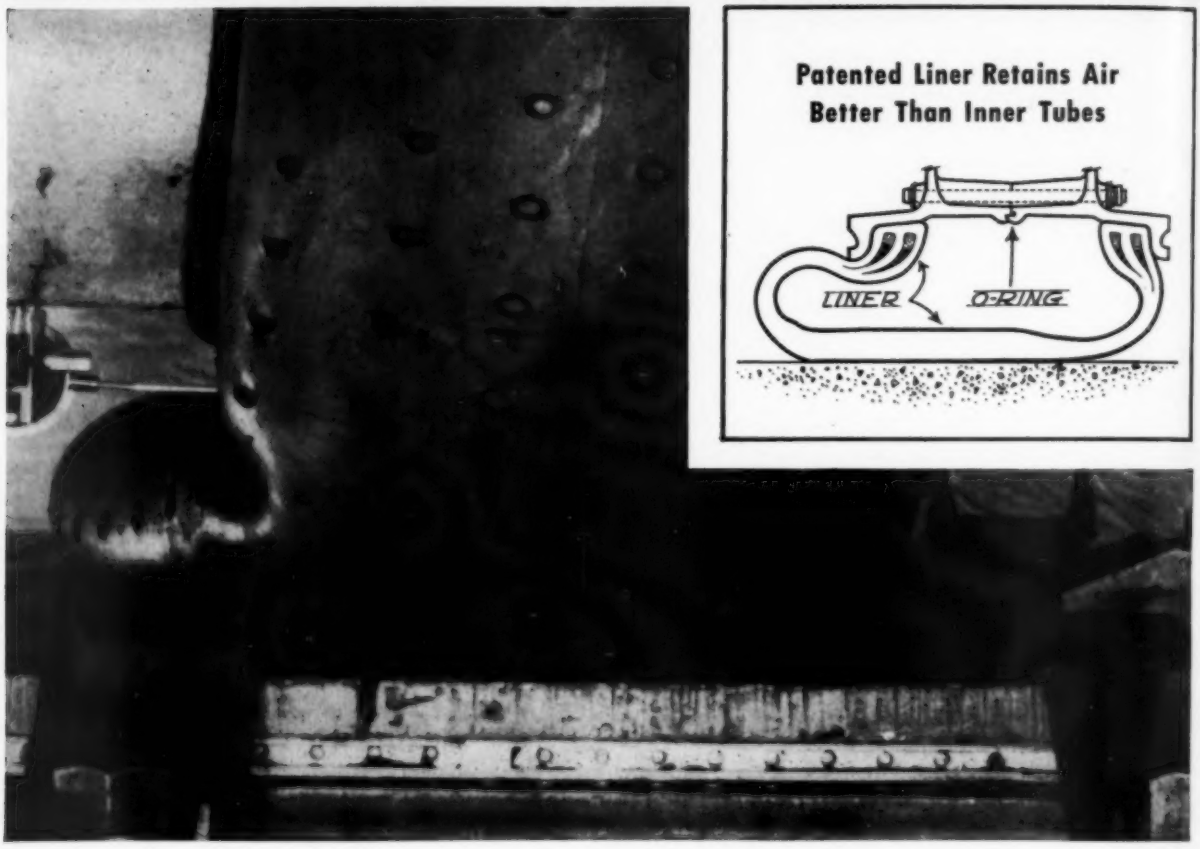

Patented Liner Retains Air Better Than Inner Tubes

Flattened under 17-ton radial load, twisted by 12-ton side load, B.F.Goodrich Tubeless holds its pressure!

IN A RECENT "cornering" test, a B. F. Goodrich Tubeless nose wheel tire was flattened under a 34,125 lb. radial load and at the same time twisted by 25,000 lbs. side pressure—conditions far more severe than actual cornering on a concrete runway under heavy load.

What happened? Load was so heavy the tire was compressed almost to the rim, side pressure so severe the tire buckled over. Yet this B. F. Goodrich Tubeless Tire remained unharmed—held every ounce of inflation pressure.

Performance like this is assured because of Tubeless Tire features developed and proved by B. F. Goodrich. Patented rim seal ridges prevent loss of air around the rim. The patented inner liner retains air much longer than conventional tubes.

The ability of B. F. Goodrich Tubeless to match the safest conventional tire in performance has been confirmed by five years of flight testing on military and commercial planes. But only Tubeless offers unique advantages such as weight saving and superior air retention. One airline reduced weight as much as 120 pounds per plane.

B. F. Goodrich commercial type Tubeless for airlines and high pressure Tubeless for fast fighters—both are in regular production.

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Why USAF Plans Cutback in Wing Strength

Fewer aircraft believed necessary because new combat and transport planes are much more potent than old ones.

By HENRY T. SIMMONS

The Air Force will drop its 137-wing goal in Fiscal 1958, almost immediately after it completes its long buildup to that mark.

The airmen expect to lop two or three wings from their force level during the upcoming fiscal year, AMERICAN AVIATION has learned. This cut will be followed by additional reductions in later years which will ultimately bring USAF strength to a level of 130 or 131 wings.

• **The decision** to trim Air Force wings has no relation to the study by the Joint Chiefs of Staff of the extent to which Army missiles can take over the close-support functions up to now performed by the Tactical Air Command. Defense Secretary Charles Wilson ordered the study in his clarification of military roles and missions last month, but it is not expected to be completed until 1958.

It is believed the Administration will announce the USAF cutback when it makes public its budget request for next fiscal year, beginning July 1, 1957. This should come early in January.

Rationale of the reduction in air wings is the fact that the combat and transport aircraft slated to come into the USAF inventory next year and in later years are so immensely more potent than the machines they will replace that substantially fewer numbers of them will be needed to perform the same missions.

This thinking applies principally to the Tactical Air Command and the Troop Carrier Command. It is doubtful whether the Air Force is presently contemplating a cutback in the wings of the Strategic Air Command or the Air Defense Command, but even these relatively sacrosanct forces may not be immune to reductions in future years.

In the case of the Troop Carrier Command, the Air Force believes that advanced transports now becoming available like the Lockheed C-130 and the Douglas C-133 are so much more capable than present equipment that a single wing of the new transports can do the job of several wings of present models.

• **A similar approach** is being taken with regard to TAC. It will be pointed out that a single wing of modern fighter-bombers, equipped with nuclear weapons and precision bombing systems, can do in a single afternoon what entire air forces required years to do in World War II and the Korean War. Thus a reduction in TAC wing strength would not mean that the capacity of the U.S. to wage war would be impaired.

The Administration is understandably apprehensive about the reception its wing cutback will receive in Congress. It may be expected to go to considerable lengths in trying to convince the lawmakers that the reductions will not adversely affect U.S. military strength. But if past experience is any indication, a major row can be expected to erupt over the cutback.

To some extent, the TAC reduction will anticipate the work of the JCS in determining the extent to which Army missiles can replace Air Force fighter-bombers. But where the Air Force-inspired reductions in TAC are not designed to reduce its genuine combat capability, the theory of the JCS study is that the nation can afford a substantial slash in its tactical air arm provided the Army can fill its own needs for close-in ground support.

The airmen are urging extreme caution in this approach to the prob-

SAC's New Long-Range Bombing Team

High-speed, high-altitude refueling tests of Strategic Air Command's B-52 eight-jet bombers by the KC-135 four-jet tanker are being conducted by Boeing Airplane Co. This is first photo of the jet-to-jet refueling team. Boeing has been ordered to step up KC-135 production to 20 aircraft per month.

lem. They point out that TAC's top priority mission is to win air superiority. Close ground support, interdiction and other missions are secondary to that objective. The Air Force accordingly insists that it be left with sufficient fighter-bomber forces to achieve air superiority, which includes attacks on enemy airbases, regardless of whether those same forces are needed to provide close support for the Army in the later stages of the campaign.

When the Air Force wing buildup is completed late this fiscal year, the force will consist of at least one more Troop Carrier wing and at least one less TAC wing than originally planned. As of Oct. 13, the Air Force had 131 wings. These were assigned as follows: SAC, 51; TAC, 35; ADC, 32, and TCC, 13. ◆◆◆

Gen. Cook Named President of AIA

Gen. Orval R. Cook, USAF (Ret.), has been named to succeed Adm. DeWitt C. Ramsey, USN (Ret.), as president of Aircraft Industries Assn.

Adm. Ramsey will step down from his post early next year. He was elected vice chairman of the AIA board of governors and will probably serve in this capacity until July 1, 1958, the term originally fixed for his tenure as AIA president under his contract. It is believed Adm. Ramsey's health was a principal reason for his decision to step down.

GEN. COOK

Gen. Cook retired from USAF on May 31, 1956. He was deputy commander of the U.S. European Command at that time. His last Washington assignment was Deputy Chief of Staff of the Air Force for Materiel.

Malcolm P. Ferguson, president of Bendix Aviation Corp., was elected chairman of the AIA board of governors for the first six months of 1957. Whitley C. Collins, president of Northrop Aircraft, will serve as chairman during the last half of the year. Re-elected were Lee Webb as v.p. and general manager of AIA's western region, and Harrison Brand Jr. as secretary-treasurer.

Altschul Lectures

Selig Altschul, contributing financial editor of AMERICAN AVIATION, for the eighth consecutive year is giving the aviation lectures before the New York Institute of Finance, affiliated with the New York Stock Exchange. Altschul spoke on the airline industry October 22, will review the aircraft group January 7.

New Northrop Jet Trainer to Replace Lockheed T-33 in Air Force Program

By LOIS C. PHILMUS

Air Force plans for providing all-jet flight training in primary and basic flight schools began to form into a definite mold in recent days. Highlighting events was the disclosure that the Air Force will replace the Lockheed T33 with a new twin-jet supersonic trainer being developed by Northrop Aircraft, Inc.

Present plans call for phasing-in the new Northrop trainer into the basic flight schools sometime in 1959. The Northrop development, presently called the TZ and tentatively designated the T-38, would first supplement and later completely replace the T-33.

Possibility of using the T-38 as a replacement for the obsolete B-25, still being used for multi-engine pilot training, also is getting serious consideration. Under this plan, the Air Training Command's basic flight courses would all be conducted in the high-performance jet trainer.

Air Force also has expressed interest in a medium-size jet to replace the 80 TB-25s currently used for navigational and radar training. Observers were predicting that the "off-the-shelf" jet readiness aircraft competition may serve to find a replacement for this category. The Fairchild M-185 four-jet utility aircraft, one of several entries in this category, is believed to have the edge since one of its basic design functions has been cited as nav-radar training.

• **Major emphasis,** however, is being placed on the T-33 replacement. The Northrop delta-wing prototype is scheduled to fly in the summer of 1958. To be powered by either the Fairchild J83 or General Electric J85, it is expected to have speeds over 800 mph and rate of climb will be about 30,000 feet per minute.

Original development contract was let by the Air Force last spring and, although Pentagon officials declined to comment, it is presumed that prototype contract has or will be let very shortly. One top official estimated that about 400 of the Northrop planes would be assigned to basic training units in the program.

Lockheed, which has produced about 5,000 of the T-33s, expects to phase out production in late 1958 or very early 1959. Total production at that time is expected to reach 5,500.

Simultaneously, the Air Force is proceeding with the program to convert primary training now given at the nine contract schools in North American T-28 piston aircraft over to the new Cessna T-37 light jet trainer.

• **While Air Force spokesmen** acknowledge that the development program is about 18 months behind schedule, the service is still shooting at a 1958 target for start of the transition. The phase-in will be activated as rapidly as the T-37s can be produced.

Some minor technical difficulties, peculiar to new designs, including some landing gear problems recently, have held up the project. But the Air Force is emphatic in stating that no other jet trainer is being considered at this time and all plans are built around the T-37.

Pentagon sources revealed that budget money has been approved for two additional orders of 20 and 27 T-37s each from Cessna and delivery of the first of the original order for 11 evaluation units was expected at press time. The evaluation units are being delivered to James Connally AFB where Flying Training Air Force will begin the first-phase of its instructional evaluation. The tests at Waco are expected to take at least six months, commencing in January. Selected groups of cadets will be put through the various instructional programs being considered with key instructors from the nine contract schools participating.

• **Preparatory** to the official FLY-TAF project, two experimental classes of student pilots are being put through a T-33 program at Laredo AFB, Tex. The two programs call for 40 to 80 hours, respectively, in the Beech T-34, to help determine if the amount of primary flight hours could be reduced, prior to entering jet transition in the basic training.

The "DZ" program, about one-third completed, provides a "control" class with 40 hours of flight orientation in the T-34 and T-28 trainers, followed by 177 hours in basic jet compared with the "HY" program provides 80 hours of primary flight hours and a total of 140 hours in the T-33.

Officials are optimistic about the experiment and have found that the attrition rate is not unduly high. So far, jet solo time has been cut from about 152 hours to about 58 hours.

Correction

Boeing Airplane Co.'s nine-month sales figure was incorrectly quoted in the November 19 issue of AMERICAN AVIATION (page 12). Boeing's sales actually amounted to $671,628,000 (not $76,628,000 as reported). AMERICAN AVIATION regrets the typographical error.

ARS Hears New Details of Research Rockets

NEW YORK—A long-range Navy plan, involving use of combination rocket and turbojet powerplants for future high-speed, high-altitude aircraft, was unfolded here recently by RAdm James S. Russell, chief of the Bureau of Aeronautics.

Addressing the 11th Annual Meeting of the American Rocket Society, Russell said turbo-rocket power represents the manifest answer to needs for higher speed and altitude coupled with reasonable endurance in future combat aircraft.

Navy studies, he added, indicate the combination propulsion unit will produce a marked increase in high-altitude performance, including greater altitude capability, better acceleration and substantially improved maneuverability.

• **The BuAer chief** also revealed new details of Navy's Sidewinder air-to-air missile describing it as a heat-seeker using an unbelievably small number of parts and a power supply weighing less than an ounce.

Russell classed the Sidewinder as a five-inch rocket with a small guidance section added and said it is the only missile that can be built at a price comparable to a load of aircraft cannon bullets.

Missile-Equipped Cruisers

He also told ARS the Navy expects to have its first Talos missile-equipped cruiser in active duty in 1958 supplementing the cruiser Boston and Canberra and destroyer Gyatt now fitted with Terriers. By 1961, Russell forecasts the Navy will have at least eight Talos cruisers, 22 ships carrying the Terrier and 17 fitted with Tartars.

In other ARS meeting developments:

• General Electric's George L. Macpherson said the company's X405 Vanguard earth satellite first-stage rocket will produce more than 27,000 pounds sea level thrust and have a burning time of approximately 150 seconds. First X405 was delivered to The Martin Co. by GE on schedule on October 1.

• Naval Research Laboratory's Homer E. Newell, Jr. named no fewer than nine rocket vehicles now being used in upper air exploration including the Aerobee, Deacon, Cajun, Asp, Nike-Deacon, Nike-Cajun, Rockoon, Veronique and Monica. Present needs, he added, call for rockets to carry instruments to peak altitude ranging from 20 to 200 miles with payloads of less than 25 lbs. to more than 200 lbs.

Newell termed the firings of the Viking and Aerobee "complex, difficult and costly," contending that only solid-propellant rockets offer real promise to fill the need for a vehicle that can be set up and fired at remote locations with reasonable costs and reasonable engineering, logistic and operational support.

As to rocket costs, he pegged the Viking as too expensive even for the Department of Defense in normal upper atmosphere. That of the Aerobee, which costs between $30,000 and $40,000 per rocket including booster, propellants, recovery parachutes, servicing and launching charges, runs an order of magnitude less than the Viking thus permitting a large number of firings for the cost of a single Viking.

Aerobee Costly

Even the Aerobee is too costly for most private institutions, Newell added, pointing to the need for serious effort to bring prices down. The NRL scientist expressed hope that the Iris rocket, solid-propellant counterpart of the Aerobees, will be considerably less expensive.

• Air Force's Robert M. Slavin of Cambridge Research Center said launchings were due to start last month at Holloman AFB, N. M. in that service's Rockaire program. In a typical flight, the rocket (an Aerojet Aerosound) is carried under the wing of an F-86D. At about 35,000 ft., the F-86 assumes a vertical attitude and launches the rocket.

This phase will prove out theoretical calculation of Rockaire system. Phase 2 will add instrumentation, ground tracking and telemetering, and a third phase introduces a Convair C-131B with airborne telemetry and tracking devices as a "mother" ship to accompany the F-86 and collect data during the rocket flight.

Major contractors in the Rockaire project, Slavin said, is Douglas Aircraft Co.

He anticipates USAF extension of this program to the point where 30- to

Formation of Four Supersonic F8U-1 Crusaders

Four supersonic Chance Vought F8U-1 Navy dayfighters from Naval Air Test Center, Patuxent River, Md., are shown in formation flight. Crusaders are in 1,000 mph-plus category, one holding the national speed record of 1,015 mph. Planes have variable incidence wings for takeoff and landing and have 20 mm cannon as standard armament. Each is powered by a Pratt & Whitney J57.

ARS Elections and Awards

American Rocket Society has named Cdr. Robert C. Truax (USN), now assigned to USAF Air Research and Development Commands ballistic missile program, as president for 1957. George P. Sutton of North American Aviation's Rocketdyne division was elected vice president. Following received ARS awards:

- **Astronautics Award—Joseph Kaplan, chairman of U.S. national committee for International Geophysical Year.**
- **G. Edward Pendray Award—Hermann Oberth, consultant to Army Ballistic Missile Agency. James H. Wyld Memorial Award—Louis G. Dunn, v.p. Ramo-Wooldridge Corp. Robert H. Goddard Memorial Award—Chandler C. Ross, Aerojet-General Corp.**
- **C. N. Hickman Award—Bruce H. Sage, sr. consultant, Naval Ordnance Test Station, Inyokern, Calif.**
- **Student Award—D. L. Crabtree, Purdue Univ.**

40-lb. payloads will be carried to altitudes of about 100 miles.

• E. B. Dorling of Britain's Royal Aeronautical Establishment disclosed details of the Skylark high-altitude rocket powered by a Raven solid-propellant motor rated for 11,500 lbs. thrust for 30 seconds. Skylark is fin-stabilized, measures 25 ft. long and 17.5 in. in diameter.

Dorling said a launching installation for the Skylark has been completed at the Australian Woomera range and that first firings are due before the year end. Skylark No. 1 is expected to have potential altitude capability of 490,000 ft. with a 65-lb. payload. With plans to add a boost motor along with the Raven, this ceiling should be extended to the 700,000-ft. region late next year.

• Cost of the Nike-Cajun rocket combination runs about $7,700 each, exclusive of scientific instruments, ARS was told in a paper authorized jointly by L. M. Jones, Univ. of Michigan; W. Stroud, Evans Signal Laboratory, and Warren Berning, Aberdeen Proving Ground. The rocket weighs about 1,500 lbs. at takeoff and measures 26 ft. long.

A Nike-Cajun fired in August by Ballistics Research Laboratory at White Sands Proving Ground reached 95 miles with a 60-lb. payload, the session learned. Also, a fully-equipped Nike-Cajun launching site has been built at Ft. Churchill and some 42 will be fired during the International Geophysical Year, double the original number.

• Proposal for an advanced version of the Aerobee rocket, adding a second-stage, short-duration solid rocket was presented ARS in a paper by six Aerojet-General Corp. engineers. Called Spaerobee, it would carry a 20-to-60-lb. payload to altitudes of about 400 miles. Vehicle would measure 375.7 in. overall in length, would use the Aerobee-Hi Model AGVL 0114 with booster plus an Aerojet Model 1.8 KS-7800 solid rocket.

• Up to date report of Navy and Air Force Aerobee-Hi development program was given ARS by J. W. Townsend, Jr. of Naval Research Laboratory and USAF's R. M. Slavin. Current USAF version, Model AJ-11-6, will carry a 150-pound payload to a 140-mile altitude, whereas Navy model, the RV-N-13B, carries the same payload to 147 miles. A Navy Aerobee-Hi with a 5,000-lb. Aerojet thrust unit now under development is expected to reach 167 miles with a 150-lb. payload and 188 miles carrying 120 lbs.

Army to Get Turbo Copter in 1959

The Army will have its first operational turbine-powered helicopter in service in 1959, according to present timing on the development of the Bell XH-40 Avco-Lycoming-powered T-53 helicopter. Air Materiel Command is in active negotiation with Bell for a production quantity and has already placed a contract for six YH-40s for Army service and environmental testing.

Bell, which won a competition for the Army's utility helicopter, recently completed the preliminary flight test program. Three prototypes have been completed, two for flight and one for static trials.

Evaluation tests on the experimental models will be conducted in the spring and summer of 1957 in accordance with Army prescription. The first of the 6 YH-40s are scheduled for early 1958 delivery to Fort Eustis.

AMC to date has obligated $9 million for prototypes and development models on behalf of the Army. The number of production units under negotiation has not been disclosed, but the order reportedly will be sizable.

The T-53 turbine-shafted powerplant also is an Army-sponsored development. It provides the H-40 with a cruise of about 100 knots. The turbine helicopter has a gross weight of 5,400 lbs. and a payload of about 1,000 lbs. ◆◆◆

Astronautical Society Officers Resign

Seven officers and directors of the American Astronautical Society have resigned, explaining that their "official positions are meaningless."

Included in the group were Dr. Wernher von Braun, research chief at the Army's Redstone Arsenal; Dr. S. Fred Singer, faculty member at the University of Maryland and originator of the MOUSE (Minimum Orbital Unmanned Earth Satellite) proposal, and Krafft A. Ehricke, chief of the preliminary design group of Convair's Astronautical Division.

They were quoted as stating that the Society's president, Norman V. Petersen, missiles engineer for Sperry Rand Corp., did not consult them "in the formation of Society policy."

GE's T58 To Fly On S-58 and H-21

General Electric's T58 turbine, rated in excess of 1,000 eshp, is slated to fly soon in twin engine installations in a Sikorsky S-58 and Vertol H-21 testbed.

Guy C. Shafer, general manager of GE's Small Aircraft Engine Department, said the T58 is now qualified to power these experimental type aircraft following completion of a series of endurance tests.

GE officials indicated the T58 can also be used in convertiplanes, transports and "several radically new types of aircraft."

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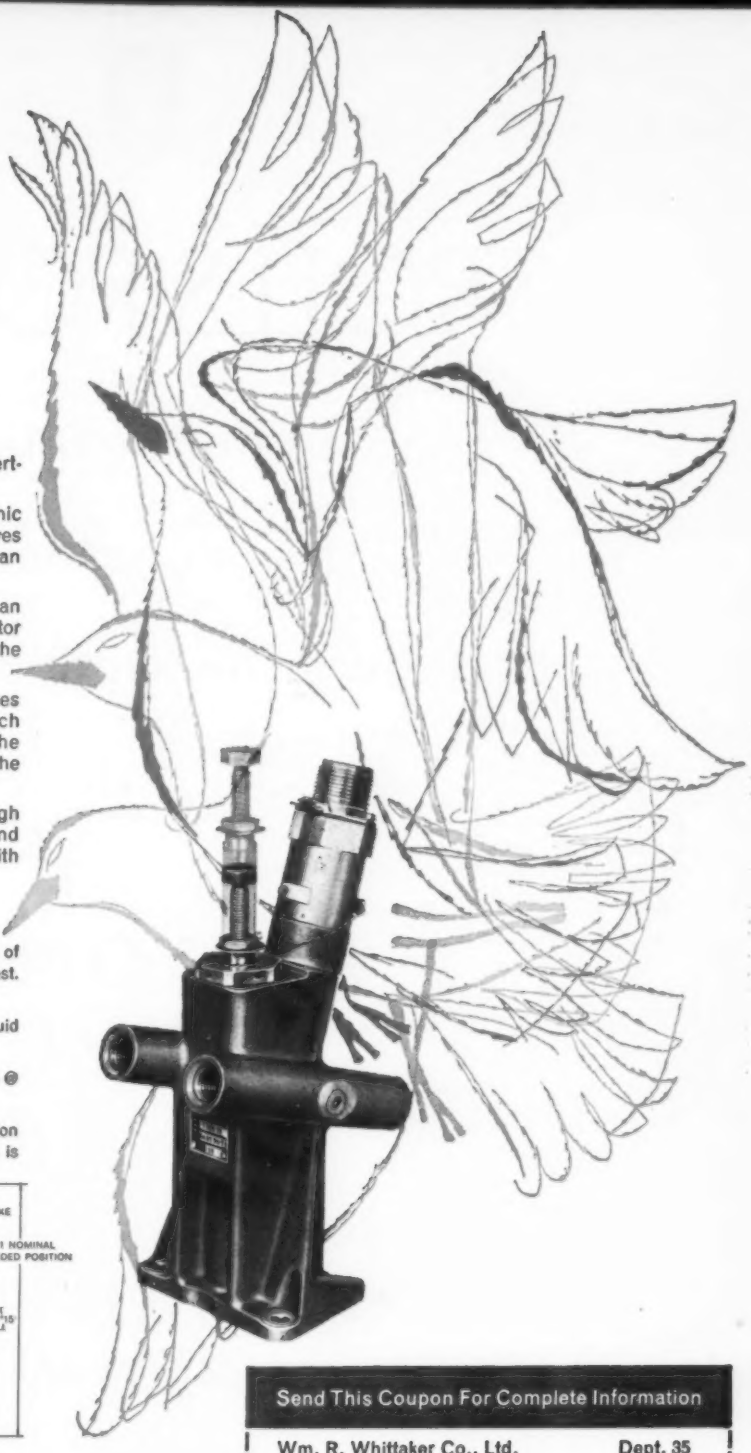
Human reaction time is not always fast enough in high performance aircraft to sense the incipient stall and prevent the stall from progressing to a full stall with subsequent loss of control.



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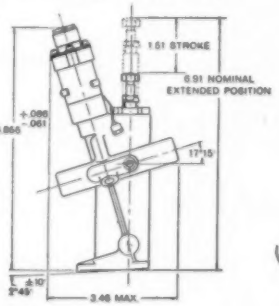

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Why Airline Stocks Fail to Attract Investors

By SELIG ALTSCHUL

There is no great investment enthusiasm for airline equities at the present time. This is evident by an analysis of a series of comparative measures as revealed in an exclusive AMERICAN AVIATION compilation presented in the accompanying table.

Market valuations are much closer to book values for some time. In fact, in a number of cases, equities are selling considerably below liquidating values of the properties they represent.

In still another measure, times-earnings ratios, moderate evaluations of current and near-term earning power are self-evident.

Furthermore, in such cases where cash dividends are being paid, yields on these equities are of nominal proportions and are hardly likely to attract investors for the income qualities they may possess.

Incongruous Status

These three separate measures point up the incongruity of the air transport industry's present investment status. The airlines are represented to be a great growth group, yet, where premiums over book values exist, they are small and confined to limited issues. Nor is earning power being capitalized at any liberal measure so typical of growth type companies.

• **For example,** equities of chemicals and electronic companies frequently sell at substantial premiums over book and at 20 times or more of current earnings. Not so the airlines; major companies command prices averaging but eight times earnings.

While there are many other industries lacking dynamic growth qualities, they do possess characteristics of stability to assure attractive income features to their stockholders. The airlines in this respect, however, leave much to be desired as income yields are neither attractive nor historically stable.

A continuing appraisal of the investment position of the airlines is essential because they are rapidly approaching a series of transitions to jet operations. While a number of carriers have managed to anticipate much of their future financing requirements, there can be no assurance that additional funds will not be required within the next five years. And certainly those airlines which have not yet obtained their capital will have a more immediate problem.

• **It is essential** that a view of the industry's credit position not be distorted by the facility with which certain long-term credits were arranged with a number of insurance companies. (Eastern with $90 million at 3¾%; American, first with $75 million at 4% and another $60 million at 4¼%; United, $120 million at 4.%

All of these loans and other long-term credits in the industry rest on a solid bedrock of equity capital. This equity provides the "cushions" or protection which fiduciary institutions require for their loans.

Certain debt/equity ratios must be maintained which influence the level of loans that can be outstanding at any one time. Hence, the key to the industry's capacity to finance expansion requirements remains—where it always has been—in its ability to attract equity capital.

As pointed out here nearly a year ago (AMERICAN AVIATION, January 16, 1956), it is not enough that a slight market premium over book occur during abnormal boom market conditions. It is the normal experience developed over a period of years that generally controls.

• **Prevailing market/book value ratios** show wide variations among the separate airlines.

The highest premium over book is present in the market price of Northeast. In this case the dominating consideration is the potential that is presumed in the company's new route to Florida. It will remain for these potentials to be translated into tangible earnings to support this market premium over book value. If such earnings do not materialize this market/book value ratio will soon adjust itself more in line with the industry experience.

American Premium Highest

American's equity sells at the highest market premium over book in keeping with its historical experience. Much of this premium probably resulted from the leverage previously built-in its capital structure through senior securities. However, American, over the years, has been losing much of the premium it previously enjoyed. For example, in 1949 the market/book value ratio aver-

Comparison of Major Airline Stocks on Common Share Basis

AIRLINE	Book Value as of March 31, 1956	Market Price Nov. 27, 1956	Market/Book Ratio	Estimated 1956 Earnings	Times 1956 Est. Earnings	Current Indicated Annual Dividend	Current Indicated Yield %
American	$13.54	22¼	1.64	$2.75	8.1	$1.00	4.5
Braniff	12.99	10⅞	0.84	0.90	12.1	0.60	5.5
Capital	17.05	25¼	1.48	(d)	.....	.....	.....
Continental	12.42	11½	0.93	1.50	7.7	0.50	4.3
Delta	28.47(1)	29	1.02	4.70(2)	6.2	1.20	4.1
Eastern	31.91	47	1.47	5.50	8.5	1.00*	2.1
National	23.51(1)	25⅛	1.07	4.14(2)	6.1	1.00	4.0
Northeast	4.94	10⅛	2.05	(d)	.....	.....	.....
Northwest	21.97	14¾	0.67	2.00	7.4	0.80	5.4
Pan American	19.12	17	0.89	2.00	8.5	0.80	4.7
T W A	20.11	17	0.85	0.25	.....	.....	.....
United	32.90	29¾	1.21	4.25	9.4	1.50	3.8
Western	17.82	23½	1.32	3.00	7.8	0.95*	4.0

Notes: *Plus stock. (d) Deficit. (1) As of June 30, 1956. (2) For 12 months ended June 30, 1956.

aged 2.77 as compared to the more recent 1.64.

United and Eastern, on the other hand, have been improving their relative positions. In 1949 the same measure for these two companies averaged 0.71 and 1.31, respectively. Currently they are 1.21 and 1.47, respectively.

• **Market quotations** taken by themselves are sometimes helpful guides in evaluating companies. For example, at today's prices the entire equities of leading airlines are valued approximately as follows:

American	$190 million
Braniff	30 "
Capital	23 "
Continental	55 "
Delta	29 "
Eastern	118 "
National	26 "
Northeast	10 "
Northwest	21 "
Pan American	104 "
TWA	56 "
United	128 "
Western	17 "

In other words, irrespective of the senior debt which precedes the separate equities, an investment observer can reach independent conclusions as to relative values in properties. Of course, the measure of debt introduces elements of leverage which influence the values of the separate equities and should be so considered.

There are times when price/earnings ratio afford a clue as to investment stature—or lack of it. This measure indicates the price at which the market values past or current earnings. One authority on the subject states it simply: "A strong, successful, and promising company usually sells at a higher multiplier of current or average earnings than one that is less strong, less successful, and less promising . . ."

• **A major fallacy,** in this measure, is that it does not foretell a future earnings trend. Moreover, 1956 earnings used in the accompanying table are estimates and include non-recurring income. Nevertheless, it is interesting to note the narrow range of the price/earnings ratios prevailing for most of the carriers where earnings exist.

Recent stock financing for Braniff and the fact that its equity sells below book, offsets to a considerable degree the high price/earnings ratio estimated for that carrier. Premised on projected earnings as indicated, United would appear, on this basis, to enjoy the most favored investment position.

While current indicated yields are much improved over previous years for those carriers now maintaining regular dividend policies, there is still much to be desired in this respect.

Airline equities do not live in an investment vacuum but must compete on all scores with securities of other industries. For example, there are many quality issues in stable-type industries with long dividend records which currently afford yields of 5½% and higher.

The air transport industry has a long way to go before its equities can compete as proper investments for fiduciary accounts. ◆◆◆

Financial Briefs

AIRLINE

• **Delta Air Lines'** net earnings after taxes for the quarter ended Sept. 30 (first quarter of its fiscal year) were $485,858 against $635,923 net in same 1955 period. Operating revenues increased from $14,850,613 last year to $17,334,452, while operating expenses rose from $13,367,513 to $16,227,465.

• **TWA showed net** of $5,566,000 in the third quarter, against $4,186,000 profit in same 1955 period, and wiped out its first-half loss of $5,396,000. Profit for nine months was $170,000, against $5,154,000 in same period last year. A new depreciation policy which resulted in an adjustment of $2,186,000 for the nine months "reduces depreciation expense by increasing residual values on latest type aircraft and engines," TWA said.

• **Northeast Airlines'** September net of $8,171 reduced its nine-months deficit to $66,378. First nine months last year showed a $122,482 profit.

• **Mohawk Arlines** filed a SEC statement seeking registration of $794,000 of 5½% convertible subordinated debentures, due Aug. 1, 1966, and 185,796 shares of $1 par capital stock, issuable on conversion of such debentures. New capital is sought in part to meet financing of Convair 240 equipment.

MANUFACTURING

• **Boeing Airplane Co.** reported $22,971,000 net on $671,628,000 sales for first nine months of 1956, against $20,333,000 profit on $588,716,000 sales in same 1955 period. Backlog on Sept. 30 was $3,230,000,000, including $550,000,000 for 707 jet transports.

• **Northrop Aircraft's** net for fiscal year ended July 31 was $4,965,071 on record sales of $322,513,290, against $11,738,764 profit on $283,462,522 sales last year. Sharp profit drop was attributed to decrease in the basic contract profit and incentive profit on the F-89 interceptor and provisions made for an anticipated loss connected with establishment of a subcontracting program.

• **Bell Aircraft Corp's** nine months net totaled $4,489,053 on $156,197,799 sales, compared with $4,547,756 profit on $154,502,403 sales in same 1955 period. Backlog on Sept. 29 was $175 million, down from $241 million at same time last year.

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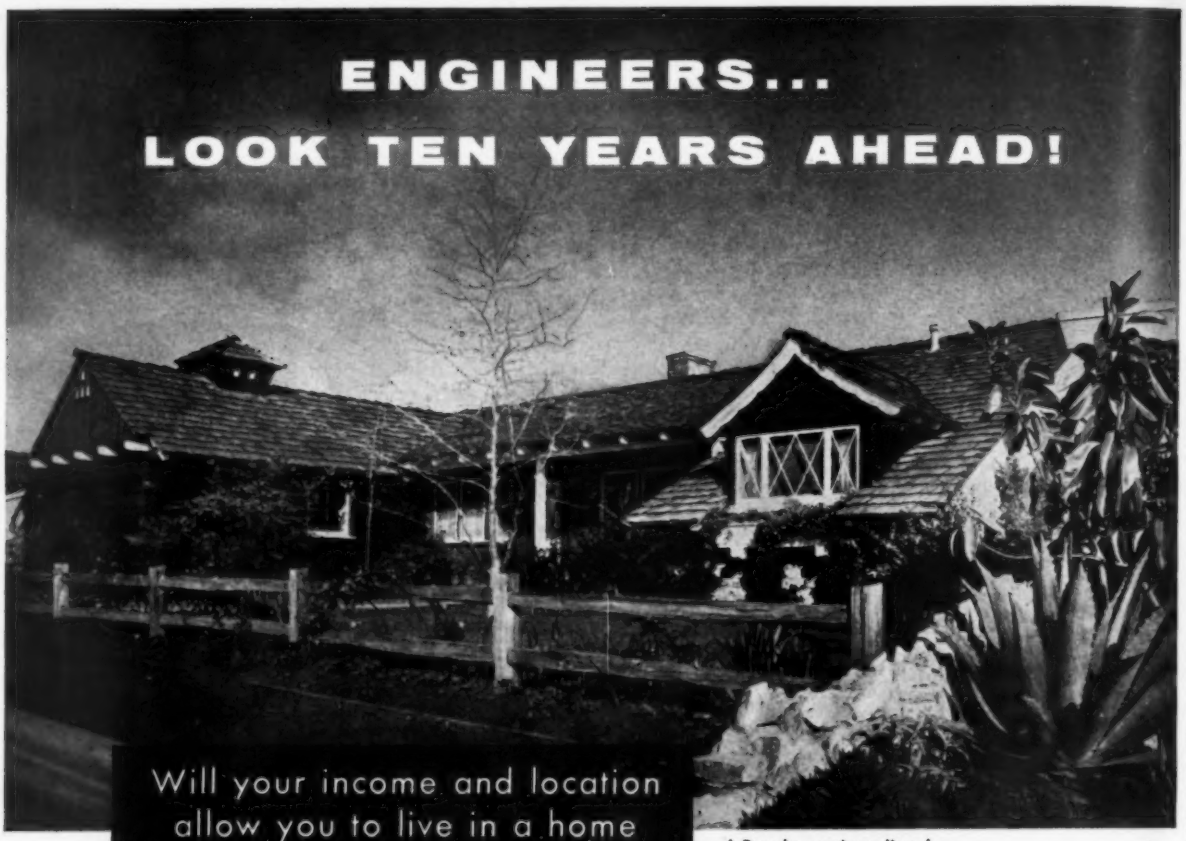

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Avro Cuts Costs with Plastic Tooling

Epoxy resins provide faster, more economical preparation of dies, tools, jigs, molds and fixtures in production of supersonic CF-105.

Avro Aircraft, Ltd., producer of Canada's CF-105 supersonic interceptor, is achieving major savings through use of plastics in tooling for the delta-wing, all-weather aircraft.

Although the use of such plastics (epoxy resins) for aircraft tooling dates back to World War II, Avro engineers feel that only recently has a plastic material been able to meet almost all of the demands for large-scale tooling of aircraft components.

Now these epoxy resins are providing faster, more economical preparation of stretch dies, forming tools, drop hammer dies, jigs, duplicate master die molds check and assembly fixtures.

• **Full extent** of the savings made possible by plastics cannot be accurately estimated at this point, as CF-105 tooling is still in progress. However, here's how Avro chief production engineer H. F. Young and tool superintendent Reg Whittington measure some of the accomplishments to date:

• Since first use of epoxy resins two years ago on the CF-100 Mark IV, Avro consumption for tools and dies has risen to more than 2,500 lbs. monthly.

• Making dies from plastics rather than metal has saved manpower. At Avro, staffing of the foundry alone has been reduced from 15 to five employes.

• Ease and speed in preparation of tools and dies has resulted in an estimated 25-50% savings in overall labor costs. On stretch dies, Avro has experienced a 30% saving in cost of preparation compared with other methods.

As a result of these factors, Avro is placing increasing emphasis on epoxy tools to effect further reduction in tooling manhours. Too, the company finds plastic tools are particularly effective in cutting costs on the comparatively short production runs that prevail in aircraft manufacturing.

Epoxy-faced die requires only hand-rubbing to bring out smooth surfaces. Radii are being touched up here with a sander.

'Adequate' Substitutes

As Avro engineers see it, design and operating factors considered, all plastic tools have inherent characteristics that are either adequate or alternative substitutes for tools and dies formerly made with metal. And if they prove adequate for the tooling job for which they are designed, a number of factors would favor their use.

For one thing, they are quickly and accurately made. They require no highly skilled techniques, cost less, can be repaired and modified easily, and they are light in weight and easy to handle.

These factors, they found, also were true of the polyester and phenolic resins used at Avro—polyesters for drill and router baskets, and phenolics for stretch dies—prior to the introduction of epoxies.

But both the polyesters and phenolics had their limitations, according to Young and Whittington.

• **The phenolics,** for example, shrink considerably in curing and make close tolerances difficult to achieve. Also, after complete curing, they may show excessive creep and distortion, making them unfit for further use.

Another disadvantage is that the catalyst used to cure them, being somewhat acidic, often causes corrosion of the metal it contacts and neutralization of the die surface is required.

Another factor to consider is salvage. The Kirksite content of an epoxy-faced Kirksite core can be melted down and reused, whereas phenolic dies that employ a phenolic facing over a foamed phenolic or wooden core cannot be reclaimed.

Since first use of epoxies two years ago on the CF-100, Avro has constantly increased the number of tools and dies made with epoxies. Feeling is that, until a better material is developed, this type plastic offers more specific tooling advantages than others available today.

On this list are:

• Exceptional dimensional stability, impact strength, adhesion properties, together with minimum residual stress in cure parts, better impressions and longer wear.

• Ease and speed in preparation of dies.

• Low shrinkage in curing (about .0001″ per inch), a factor that eliminates warping and stresses and assures perfect reproduction of master patterns.

• Adaptability to repairs, and design changes. Should surface areas become defective through abuse or extended use, a strong surface can be built up simply by patching with epoxy resin. This technique also allows incorporation of design changes even while a die is on the press.

• Minimum finishing requirements for obtaining perfectly smooth forming surfaces. One example at Avro is a drop-hammer die on which hand-grinding and polishing to design contour was but a fraction of that required for a steel die.

But despite this impressive list of benefits, the Avro engineers are by no means proposing complete replacement of all metal aircraft tools and dies by plastics. Such a step, they point out, is not presently possible, although metal dies are getting stiff competition.

For example, Avro engineers find the performance of epoxy tools espe-

cially noteworthy in their durability under extended production runs. In some cases the number of stampings produced equals that previously associated only with steel dies.

• Second only to their performance is the effect they are having on man-hour costs. Experience has shown that machining of a metal die, plus intricate tools and fixtures, cannot compete with the low fabrication cost of an epoxy-faced die. This is particularly the case when complex curves and contours are involved that would ordinarily require time-consuming machining and hand-barbering operations.

Also, plastic tools can be made directly from master die molds without excessive handwork. This eliminates the need to build shrink patterns.

With the two years of CF-100 tooling experience under its belt, Avro has entered into first large-scale use of epoxies on the CF-105. Materials used are epoxy polymers (Epons) produced exclusively by the Shell Chemical Corp., New York.

Examples of Versatility

Here are some examples of the versatility of these plastics in the CF-105 program:

• Profile milling—Duplicates taken from masters and cast in epoxy resin are used on Hydrotel and Keller machines.

• Routing—Both the bases and templates for these tools are made from the plastics.

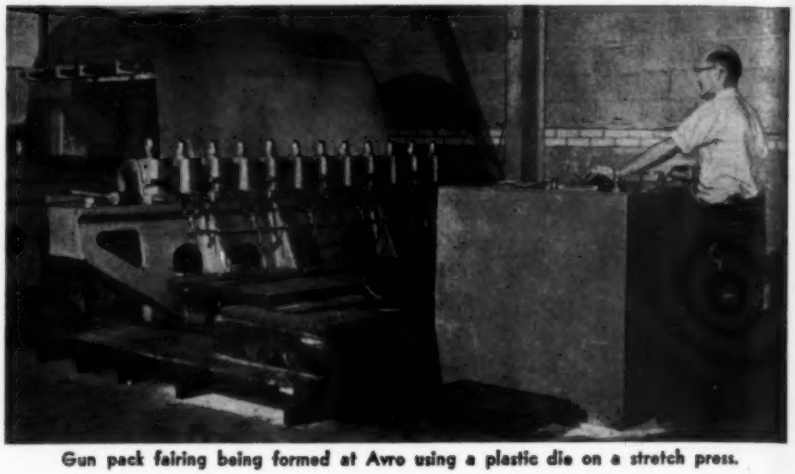
• Drill jigs—A master of production part is first prepared and the resin cast around it with the bushing being pre-set from the part by pins. This method eliminates extensive labor time formerly required for machining.

• Interchangeability reference gauges—Use of epoxy resin has replaced the former method and eliminated its difficulties in building compound curves. On all other airfoil gauge locations, Avro has eliminated machining by casting epoxy resins from masters and building them directly into the gauges.

• Jigs and fixtures—Resin is used to locate faces that involve airfoil curves or difficult-to-reach points which can be easily cast but would be hard to machine.

• Master models—Avro tool engineers have done considerable experimental work with use of the resins for master model-making with some success. So far they have completed wing leading edges and masters on an armament bay and the models proved stable without bulging or distortion.

They feel this use of epoxies could be a major one in the aircraft industry since it serves to remove difficulties previously encountered in the use of wood and plaster—mainly distortion and growth due to damp weather.



Gun pack fairing being formed at Avro using a plastic die on a stretch press.

Young and Whittington predict that major tooling applications for epoxies will be in the facing of hollow Kirksite cores for stretch press dies used in forming 75ST aluminum skins for fuselages and leading edges.

Here, the material replaced is solid Kirksite. At one time, Avro built many stretch drop hammer dies out of Kirksite alone, experienced shrinkage of about ⅛ in. to the foot. This required casting of larger dies followed by excessive die-spotting and hand-dressing operations to obtain proper dimensions.

The combination of epoxy facing and Kirksite core does away with this wasteful effort, with no loss in strength or accuracy.

• Epoxy-faced dies have truly impressive impact strength and will handle almost any thickness of aluminum stock press-formed to about 3/16" maximum, the tool specialists say. And they are ideal for press forming operations, because they do not pierce or fracture the sheet metal.

An as an extension of their work at Avro with aluminum, engineers are now testing heated epoxy-faced dies for forming magnesium parts with results that look most promising.

Stretch Dies Stand Up

In CF-100 fabrication, experience showed that epoxy-faced stretch dies stood up well in production and Avro expects they will prove useful for the full run of components. For the CF-100, several hundred aluminum skins were formed on the original die, and additional units could have been fabricated if needed.

In constructing epoxy dies, Avro employs standard tooling techniques. First a pattern is made of the part to be formed, then master models are prepared by taking a plaster splash from the master. This splash, about two to three inches thick, is supported by piping, wood and hemp filler.

Foundry cores in Kirksite are then taken from the male mold, which is made with an overall core size ¼ in. less than the master mold dimensions. The epoxy facing of the final die eliminates the need for oversized dimensions of the die to allow for shrinkage.

The female splash is then built up with ¼ in. of caulking compound and the male splash poured over the caulking to provide the pattern for the Kirksite core. The male splash is then removed and sent to the foundry for casting.

• In preparation for facing the die with epoxy, the caulking is removed from the female mold, all surfaces carefully smoothed, and a parting agent applied to prevent the resin from adhering to it. Quarter-inch pieces of wood are set on the female face for the Kirksite core to rest on.

After the Kirksite core has been sandblasted clean, it is suspended up-

Stretch die with epoxy facing of involved contours is ready for run on 800-ton press.

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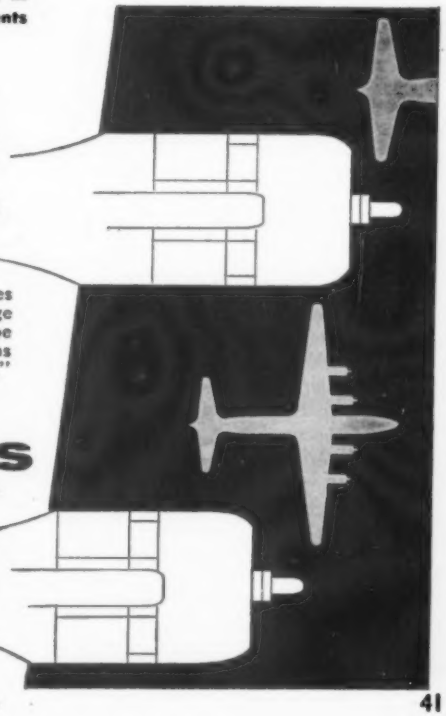

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side down in the female mold so that there is a ¼-in. air space all around it.

The casting material used at Avro to face stretch dies is No. 412M, an Epon resin-based formulation made by Kish Industries, Inc. of Lansing, Mich. A pioneer in development of epoxy formulations for aircraft tooling, the Kish firm has worked extensively with Avro in the CF-100 and CF-105 programs.

After the resin has been mixed with the curing agent, the liquid solution is poured evenly into the ¼ in. space between the Kirksite and plaster mold. Where involved contours are being shaped, one end of the mold is raised slightly to prevent entrapment of air in pockets on the mold surface.

• **The filler used** in the Kish die facing formulation contains a special ingredient that will not mar the surfaces of aluminum sheets being formed.

Avro found that the aluminum filler in such tools proved unsuitable because of occasional galls and scratches which might set up stress concentrations leading to fatigue failure.

In forming parts with high strength 75ST aluminum specified for the CF-105, such a situation had to be avoided. The special Kish filler has not only eliminated the galls, but actually "polishes" the metal being formed.

Resin Formulation Used

For stretch dies to form aluminum sheets, Avro uses a resin formulation that will cure at room temperature in about six hours. After this cure and removal from the mold, the ¼-in. epoxy face has a dense, smooth surface that calls for practically no finishing. Process at Avro is to rub the facing to a satin-smooth finish with wet sandpaper and touch up radii with a sander.

Dies for forming magnesium sheets require a facing with a temperature-resistant Epon resin formulation. At present, Avro engineers are only experimenting with this type of stretch die. Procedure for using these resins is similar to room-temperature types, except that the die is over-cured in this cycle—250°F. for two hours; 350°F—two hours; 400°F—one hour.

• **In production** prior to forming, plan at Avro is to preheat the magnesium sheets with heating lamps to about 400-500°F. During forming, a 15-mil glass cloth blanket will be placed between the magnesium sheet and die block to prevent the latter from absorbing excess heat, or possibly cooling off the skin before it has been stretched.

Avro engineers are convinced that through proper formulation, epoxy resins make possible a wide range of hardness values and impact strengths. For example, by varying the amount of curing agents or hardeners used, they have produced cured tools to satisfy unusual tooling requirements. ◆◆◆

Sam Saint Says . . . .

Tough Hurdle for Mr. Curtis

Roughest roadblock for Edward P. Curtis, Special Assistant to the President for Aviation Facilities Planning: No one has yet defined the problem he faces. Passengers and pilots—in fact, everyone from congressmen to baggage handlers—all agree that air traffic is messed up from the taxicab on this end to the taxicab on the other end. Air traffic is a *big* problem, no argument there. But *what* the problem is remains a question.

Air Coordinating Committee, the agency responsible for saying what gadgets must do to untangle jammed air traffic, has not said. Engineers peel the gobbledegook from ACC documents looking for detailed guidance and find little meat beneath glittering generalities.

In expressing concern over this gaping hole in the development effort the writer is in distinguished company. Dr. George Valley, associate director of Lincoln Laboratory, told the spring assembly of the Radio Technical Commission for Aeronautics in Boston: "It seems to me that we have got to say out loud just what it is that we want airplanes to do."

• **Dr. Valley played** a major role in development of the giant electronic SAGE system of air defense, a problem resembling the air traffic control situation. He is eminently qualified to state: "I think that this (air traffic control solution) is not going to be a cheap enterprise; it isn't going to be quick; and it isn't going to be easy. But it will be quicker and cheaper and easier if we first state what it is that we want to do before we make plans for doing it . . ."

Maj. General Gordon Blake, USAF Director of Communications-Electronics, told the same audience: "We fall down . . . in not clearly defining what job we want done."

•

These men are right. You can lay all the committee sitters end to end; it still remains true: There is not today anywhere a clear and detailed and generally accepted statement of what an air traffic control system must do. There exists confusion and disagreement in Air Coordinating Committee documents and RTCA documents on many basic questions of operating policy.

Take the question of who flies when there is not room for everyone. Incredible as it may seem to an outsider there is no effective policy on this question. How priority cards (landing times) are handed out will determine what is left in the till after the bills are paid. Still there is no generally accepted policy.

•

Pilots and operating people are snowed under fighting the battle of today's schedules. Only a handful of these operating types realize that the "Common System Bible" (SC-31) of the RTCA and the ACC policy document, Air Traffic Control and the National Security (SWG-5) expound two exactly opposite policies on this all-important question of landing priority.

• **The RTCA method** of flow denies the right of the pilot to say whether a trip will operate and to what destination. The ACC document, on the other hand, calls for a method of flow control that allows the pilot to control his own shots as he does now. The basis for deciding who flies and who doesn't fly, and who gets diverted to which airport under what conditions, is radically different in these two key documents. No one has told Mr. Curtis which document applies.

Many other questions of operating practice will be decided by the engineering fraternity when they decide which wires to put on what binding posts. Will pilots do their own navigating? Or be led blindly by the hand? Will speed be controlled to a knot's eyebrow? Will planes be separated by rigid adherence to a flight plan approved by an electronic brain and locked up inside a magnetic storage device?

•

Other safety and economic factors important to both civil and military operators will be locked up in the gimbals when the soldering irons have cooled and the lids are clamped on the black boxes. Will the system depend solely on ground radar? Will the system be so enmeshed with the SAGE defense system that we must start over again if SAGE is ever turned off?

Toughest problems facing Mr. Curtis are not technical or scientific or mathematical problems. The toughest hurdle is a maze of unresolved differences of operational philosophy. This is what should concern Mr. Curtis first.

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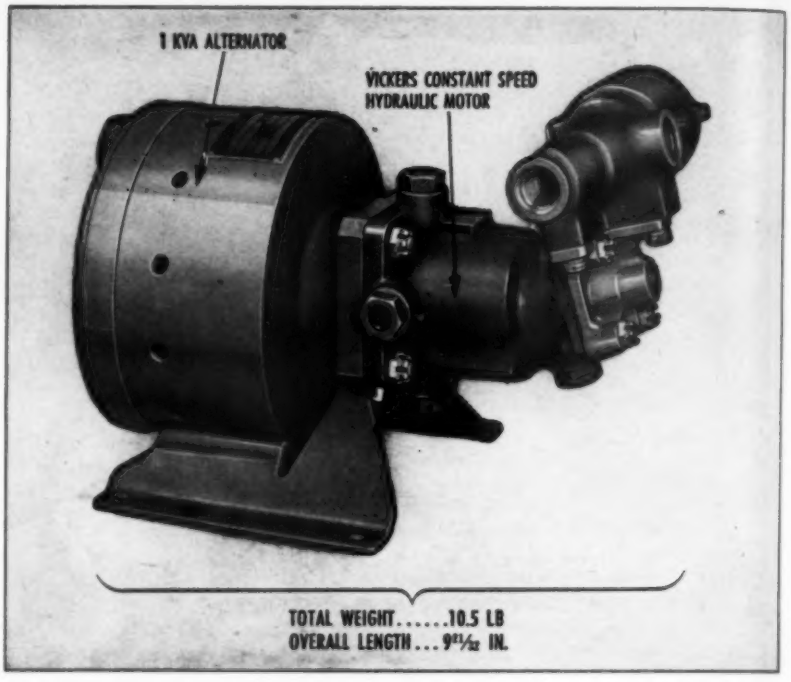
New Vickers Airborne Electrical Power Package

. . . Saves Weight and Space

Utilizes the Hydraulic System for More Efficient Production of AC Power

This new isolated electrical power package provides closely regulated AC power with minimum weight and envelope while drawing its power from a hydraulic system. In new designs or when adding electronic equipment to aircraft designs in which the electrical system is already loaded to capacity, this versatile package provides the needed AC power from flow available in the hydraulic system. This generally is permissible without system change as the full flow is seldom demanded except for a few seconds under rare circumstances. Even in such cases, full flow can be guaranteed to these hydraulic functions through the use of a simple priority valve which starves the AC power package momentarily.



Less Weight and More Efficient

Important weight savings are achieved through the use of this package instead of an inverter which may also require an increase in the DC generator and line capacities. In one instance, the 10.5 lb 1 kva package replaced a 38 lb inverter for co-pilot instrumentation. An additional advantage is that the package has 62% overall efficiency while that of the inverter was 35-40%.

Extreme altitude operation is no problem as the Vickers isolated electrical power package contains no brushes or other altitude-sensitive components.

Features of AC Generator

The permanent magnet type AC generator has excellent life and reliability. It requires no bulky voltage regulator . . . is inherently smaller and lighter than conventional generators due to the elimination of the exciter and slip rings. It also has higher overall efficiency resulting from elimination of all excitation losses. Additional advantages are that the permanent magnet is unaffected by momentary short circuit, or separation of field and armature without keeper, or by temperature cycling. It is also not susceptible to aging or shock. This unit is 120/208 volt, three phase, wye connected with 400 cps at 8000 rpm. It is capable of continuous duty under environments of 0-55,000 feet altitude and ambient temperatures from −65 F to 250 F.

Hydraulic Motor Drive

The generator is directly driven by a Vickers Constant Speed Hydraulic Motor having fixed stroke and an integral flow control valve that maintains an 8000 rpm speed setting within ±2½% regardless of the load (as long as valve inlet pressure is greater than load requirement). For the unit shown above, maximum operating pressure is 3000 psi while rated output of 1 kva requires operating pressure of 2200 psi. Special configurations will maintain 400 cps frequency within ±0.1% regardless of load. This motor has a very high horsepower-weight ratio and its overall efficiency exceeds 92%. It is a time-proved design capable of many hundreds of hours of continuous service without attention.

Many Uses and Sizes

The applications for this isolated power source are numerous. For multi-engine aircraft, its use for co-pilot instruments provides dual reliability. This package has been used to supply controlled frequency AC power in emergencies when the only source of power in the airplane is a ram air turbine driven pump. The efficiency of this arrangement minimizes the size and weight of the ram air turbine necessary to provide emergency hydraulic and electric power. 7492

Now available in the sizes listed below, larger packages can also be supplied from existing components. Vickers is prepared to develop the package best suited to a specific need. For further information, write for bulletin A-5213 or get in touch with your nearest Vickers Aircraft Application Engineer.

Vickers Airborne Electrical Power Packages

kva output	weight, pounds
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1.0	10.5
1.5	12.5
2.0	15
2.5	17
3.0	19

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ICBM Program May Trigger New Technology

Dr. Ridenour, director of research for Lockheed Missiles Systems, tells how current work in this field may be used in space flight.

By HENRY P. STEIER

We are at the threshold of a new electronic technology that could adapt the apparent handicaps of flight in outer space to our advantage.

Dr. Louis N. Ridenour, director of research, Lockheed Missiles Systems Division, in a talk before the recent Symposium on Optics and Microwaves in Washington, D. C., said advances toward the new technology can be expected as the ICBM program goes forward.

Ridenour believes that, since the requirements of the ballistic missile are only a little less demanding than that for the "true satellite," we will get to understand through ICBM work the space environment.

• **Qualifying his opinions** with the statement that much of the talk about conditions beyond the atmosphere is speculation, Ridenour called attention to conditions of near-certainty that have good application possibilities.

Among these are the "hard vacuum" and extreme cold that exist. Pointing out that all of space is a "vast pumping system," he suggested that hitting a vacuum tube's glass envelope "with a hammer" out in space would probably add to the tube's life and performance.

The mean-free-path between gas molecules in outer space is much less than that in the best hard vacuum tubes on earth. Operation of the tube elements in such an environment could result in extended cathode life in the tubes through reduced contamination effects.

• **We might also** take advantage of the space-vacuum for easing the problems of complicated tube construction. Traveling wave tubes, for example, are among the types notoriously difficult to design because of the existence of the glass envelope and energy losses brought about by bringing the helix part through such envelopes.

An entirely new concept in electron tube construction might exist in space ships. Tube elements could exist as mere mechanical arrangements on a mounting base.

In a compartment of a space ship exposed to the ambient vacuum condition outside the space ship, such tubes would perform very well. Weight would be saved, and movable tube elements might answer the long time dream of tube designers—change the element spacings, and thus the characteristics, while the tube is operating.

Superconductivity in Space

Considerable research is under way in U.S. laboratories on a phenomenon known as superconductivity. This work has already shown that at temperatures near absolute zero (—450°F) electrical resistivity of metals such as mercury, lead and tin nears zero.

Westinghouse Electric Corp's Research Laboratories have found that if certain elements are cooled to —450°F they become superconductors. Insulators change their resistance and superconductors become perfect magnetic shields.

Electrical current flowing in a superconductor would still be flowing 100 years from now, since the I^2R, or power, losses are near zero. The availability of good magnetic shielding materials has long perplexed electronics designers. They have resorted to using metals that need exact heat treating and careful handling during their use to avoid upsetting the efficacy of the shielding.

• **Ridenour suggested** that electronic devices for use in outer space could take advantage of the prevailing low temperatures, but that mechanical refrigeration would probably be needed to keep equipment at absolute zero. However, the power needed for refrigeration could be much less than the I^2R losses in the electronics gear.

DR. LOUIS RIDENOUR

Director of research, Lockheed Missile Systems Division, Ridenour is author of the monumental MIT Radiation Laboratory series of volumes published after World War II.

Since the resistive losses would approach nil under the low temperature conditions of the new astrionics gear, a wholly new family of components would be needed. Resistors, capacitors, inductors, etc. would not behave as do present types.

The use of these components in astrionics gear to control resistive, capacitive and inductive parameters in a circuit would be different. Design engineers would have to face a new frontier in electronic engineering.

Ridenour, in line with thinking being expressed at a mounting rate by top scientists, expressed concern over the lack of supporting funds to back research work on the need-to-know factors for using weapons.

He told the assembly it is "easy to get millions for weapons systems but difficult to get funds to support work on discovering what they will experience in environments where they will operate."

Among the efforts to use superconductivity, work is under way at the Massachusetts Institute of Technology. Computer elements called *cryotrons* are being developed there. Cryotrons are believed to be solid-state devices for switching and control. They are designed to operate in liquid helium at about —450°F.

Power consumption with cryotrons would be practically nil. A whole new order of computer size and efficiency could result from the cryotron work.

Space Communications

Ridenour called attention to two cases of space communications operations. These are space-to-ground and space-to-space.

Choice of radio frequencies in the space-to-ground case would be dominated by considerations of the atmosphere around the earth. Anything below 200 megacycles is subject to absorption, deflection back to earth or scattering by the ionosphere.

From 200 mc to about 15,000 mc the atmosphere is reasonably transparent. However, any wave length shorter than 2 centimeters (15,000 mc) is subject to absorption in water vapor above the earth.

This effect remains until the near infrared region is reached and from there to about 3,000 Angstroms the

atmosphere is reasonably transparent.

• **To date** the major experimental evidence on propagation of radio energy in the upper atmosphere and above it is related to rockets and telemetry.

Little is known about the space-to-space communication problems. Ridenour said we probably will not know much about it "for a decade." However, he said, "the ICBM program is teaching us how to face this problem."

In space there probably would be neither the absorption nor the scatter problem. Choice of frequency on that account is unrestricted.

Four considerations must be given in the choice of frequencies for space-to-space communications. These are:

• Ease of generating the radio energy.

• Ease of getting the desired antenna gain.

• Low noise figure in the detector devices.

• Ambient radio noise problems from space sources.

Ridenour believes gain will be vital to space communications. Since gain depends on the frequency chosen for a given antenna size, this factor could be a deciding one.

An important factor in the rapid development of microwave devices on earth was the relative lack of noise at these frequencies from the most potent earth sources which are man-made noise and weather noise from storms, etc.

The ambient noise in space will probably be of considerable proportions. It will extend from the visible frequencies through the ultra-violet and X-ray regions and beyond the gamma ray frequencies.

This ambient noise prospect is one in which choice of a radio frequency for space-to-space communication is faced almost blindly, considering present information scarcity.

Communications Operations

If and when a frequency is chosen to do the space job at hand we are, Ridenour said, still faced with the classical problem of alerting the other station.

"Out there" in omnidirectional signal is *literally* that, and the power needed for such a signal to be effective would probably be too much for practical consideration because of the distances involved.

The alternative is a high-gain directional antenna technique using a narrow beam. But to "shine" such a signal on the receiver, the receiver would be forced to know where the sender was in order to direct its high-gain receiving antenna at the source.

• **Ridenour suggests** a possibility for coping with this problem. It calls for communication relay stations. Operating in a fixed orbit whose location in time and distance was known with reference to another point, the relay stations would have the sole mission of relaying messages from ship to ship.

The slightly increased complexity involved in using high gain antennas at receiving and sending points would pay off and could be a substitute for sheer power since gains of 10,000 times might be achieved.

Of course other methods might be used to place calls between space ships. An omnidirectional signal might be used to ring a bell, or otherwise alert a station. The Selcal system for calling specific airline aircraft is a typical application of this method.

Or, Ridenour suggested, a bright flash of light might be used, although, at a million miles, the light energy needed would equal that from a small atomic bomb, since it would be competing with stellar light.

However, conditions might occur where stellar light in the background would not exist at a high level. This would depend upon the ship's orientation.

Navigation in Space

Speaking on navigation between the earth and moon or other planets, Ridenour carefully excluded interstellar travel. His reason for this, he said, was "on account of Mr. Einstein."

Between earth and moon the navigation task is relatively easy because of the earth's optical appearance. Masses on the earth's surface can be identified and used optically as references, or point to point radio might be used.

But for true interplanetary navigation much of what is now used and developed for navigation becomes worthless. The earth's magnetic field would serve no longer. Although "we hear a lot about inertial navigation, which is only a refinement of the gyro compass," Ridenour said, that system has difficulties for long distance navigation.

Values of gravitational acceleration are not known for long distances, and the earth's rotation is not available to erect a gyro compass.

In lieu of these problems, new reliance will be placed on celestial navigation. This type of navigation becomes particularly inviting because of lack of cloud obscuration, scattering of light and the visibility of the stars at all times.

Most important will be a good clock. New molecular clocks are being produced which have an accuracy of 1/100 second over a period of three years. These would be the same boon to the celestial navigator that the spring chronometer was to English naval operations when the chronometer was first invented.

Celestial Navigation

A mitigating circumstance operating against the use of optical celestial navigation could be the distribution and size of meteoritic particles in space. Opinions of "experts" on this matter vary by as much as 10,000 times.

Windows are needed for celestial navigation. Pitting of these windows by meteoritic particles could render the star seeking windows useless for accurate optical use.

Experiments such as will be run

888th and Last Stratofreighter

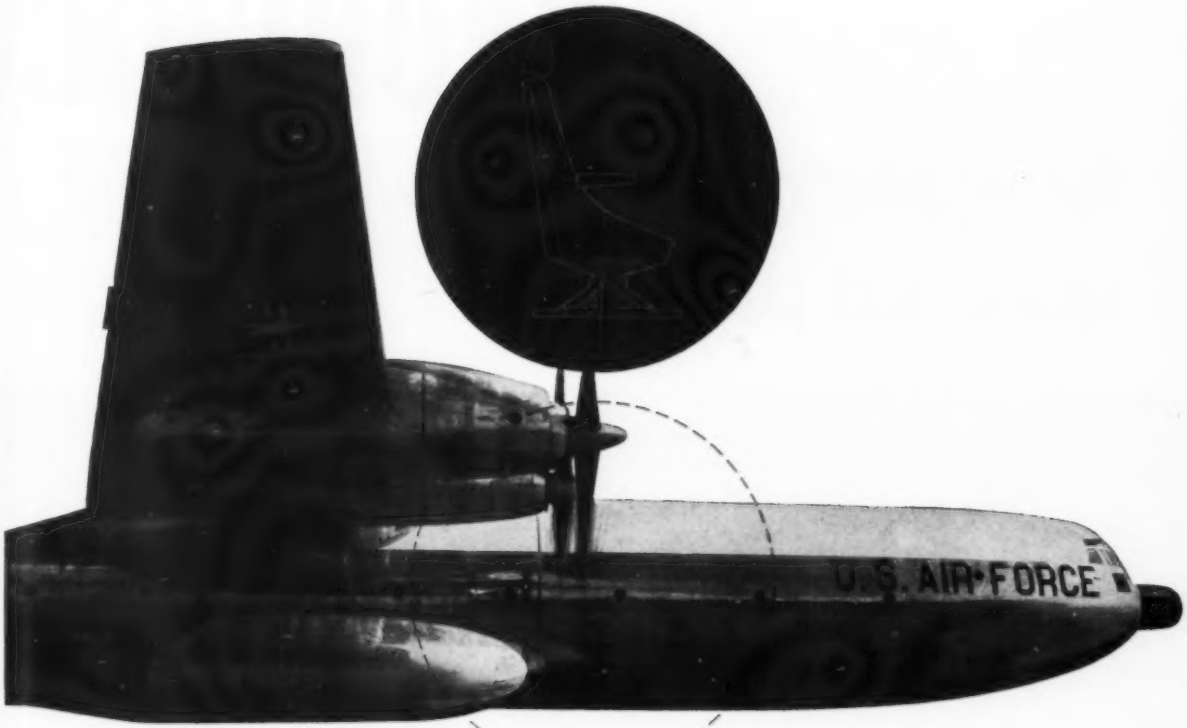
Boeing has delivered the 888th in the C-97 series of freighters and tankers built for the Air Force. Last of the Renton-built aircraft joined the 98th Air Refueling Squadron of Strategic Air Command, Lincoln AFB, Neb. First C-97 flew initially Nov. 9, 1944. Aircraft was developed from World War II B-29.

The Douglas **C-133A**

is a giant among cargo carriers.

Navigator seats for these behemoths

are designed and built by Weber.



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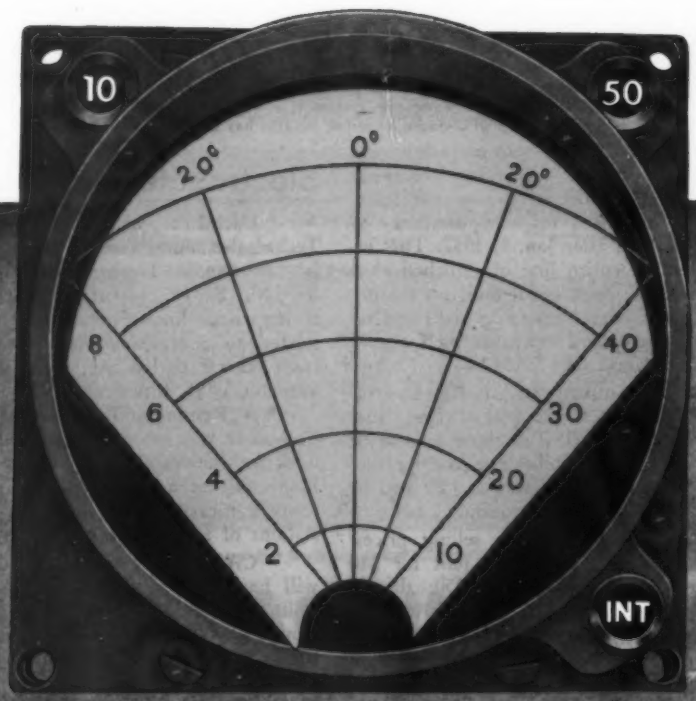
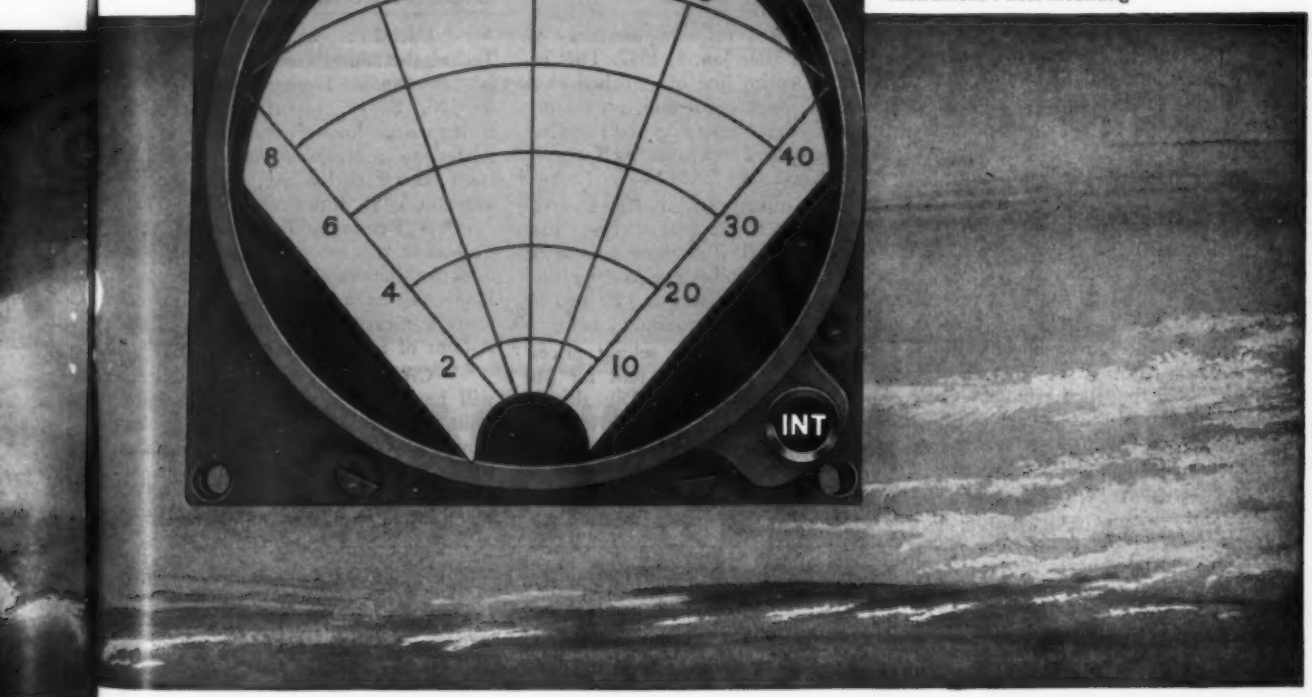


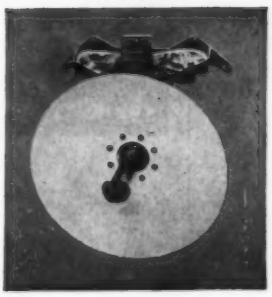
Indicator—actual size for Standard Instrument-Panel Mounting



Accessory Unit

Receiver-Transmitter

Antenna



Typical Antenna Installation in Beech D-18

with the International Geophysical Year satellites will help clear some the meteoritic particle mystery. This probably will be an effective aid to development of celestial guidance equipment for high-flying missiles and manned vehicles for flight above the atmosphere.

• **Another means** of celestial navigation is suggested from the growing amount of work on radio astronomy. Larger and larger radio "telescope" antennas are being built to capture radio signals from stars and the nebulae.

Radio Personalities

One antenna being built in Great Britain will have a 250-foot diameter. This "dish" and others nearly as big are being built in the U.S. and Germany to collect more accurate data on the exact radio frequency "personalities" of different celestial bodies.

Data obtained from the Naval Research Laboratories' radio telescope and others in operation for a few years have shown that the radio energy emitted by certain stellar bodies has distinct characteristics identifiable with that particular body.

As this information is accumulated, sorted and filed for future use, there will be a growing body of information that will lead to an eventual radio frequency chart of the heavens.

Using this to get "fix" on his location, the space navigator would just have to scan and tune to the radio frequency pattern of certain stars rather than sight on them through an optical system.

In this way the window problem could be overcome. Interplanetary encounters with swarms of meteorites would not be so destructive to navigation windows. Instead an antenna could be used, and it would have a much better chance of survival than the windows in a meteoritic storm.

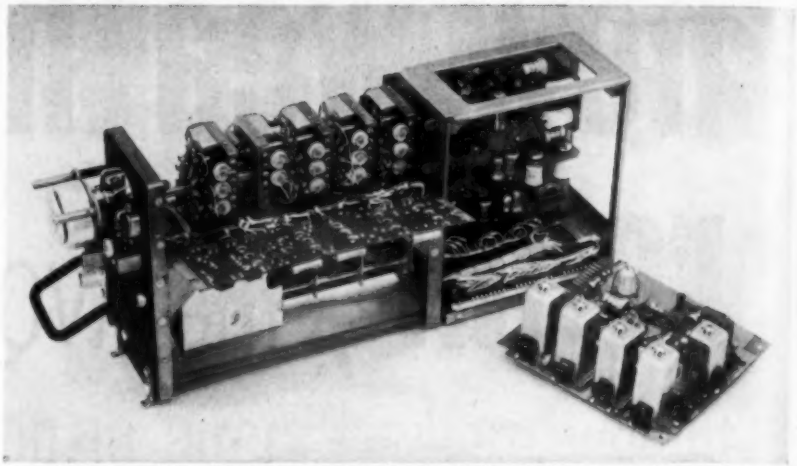
Even now there are strong indications that data on the radio emissivity of stellar bodies is being considered for use with automatic celestial navigation equipment planned as part of tomorrow's weapons. ◈◈◈

IBM Announces Two New Marketing Plans

International Business Machines Corp. announced that it will offer its electric accounting machines and electronic data processing machines under two new marketing plans. The IBM machines are widely used in the aviation industry, and have heretofore been available only on a rental basis.

The new plan is in accordance with a consent judgment entered into last January between IBM and the Department of Justice.

Transistorized Automatic Direction-Finder



Lear, Inc.'s new all-transistorized automatic direction-finder. Said to be the first such device, the ½ ATR receiver was designed to meet CAA and RTCA requirements. Complete equipment includes a Lear Ferro dynamic loop antenna, azimuth indicator, and console-type control head. Total weight of the complete system is a low 18.5 pounds. Shown here the IF Amplifier-BFO-audio amplifier module has been removed.

IBM said it will accept contracts for purchase, or for a two-year lease-purchase option, for new machines to be delivered after Jan. 1, 1957. This includes the entire line of punched card equipment, bank proof and test scoring machines, computers of all sizes and recently-announced machines such as 305 RAMAC and 650 RAMAC.

The company said it has also offered to sell, for a limited time, machines now installed or those soon to be installed. For machines purchased, rather than leased, maintenance service will be offered on a separate contract basis.

Some representative selling prices: the 24 Card Punch will rent for $40 a month and sell for $1,950; the 82 Sorter, $55 a month and $3,400; 402 Accounting Machine, $420 and $27,950; a typical electronic computer of the 700 series, $30,000 a month and $1,700,000.

Electronotes

• **Useful report** from the Radio Technical Commission for Aeronautics is "Automatic Flight." Prepared by RTCA's SC-18, report 151-56/DO-74 reviews basic know-how in this field as related to completely automatic flight from takeoff to landing. The report is available at $1.50 per copy from RTCA.

• **A Remington-Rand Univac** File Computer will be used by Capital Airlines for maintaining a seat inventory. Plan calls for automatic preparation of teletype messages to advise all Capital stations of seat inventory status.

• **CAA Tacan** ground equipment will have higher power than available military units. An increase in power from 5 kw to 12.5 kw is planned. Also, the integrated Morse code station identification signal now sent each 75 seconds will be sent at 37.5-second intervals.

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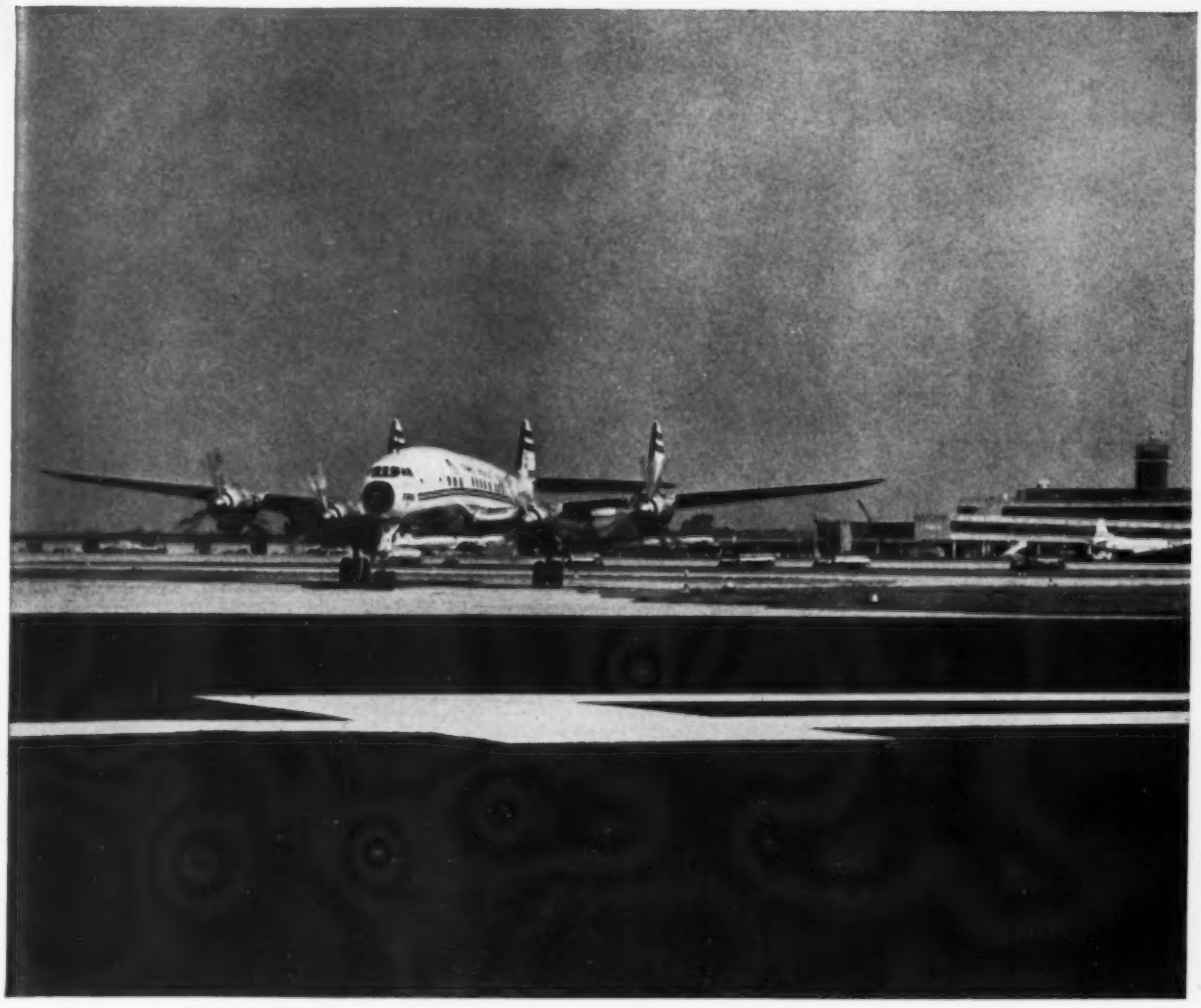

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Silvium alloy grid after corrosion test.

Non-Silvium alloy grid after same test.

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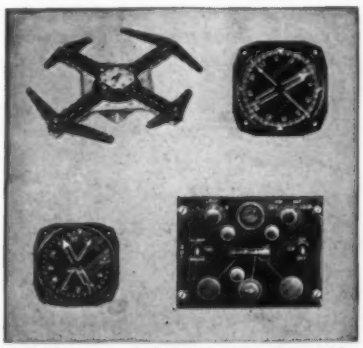
For complete information and specifications about DFA-70, write Bendix Radio, Aviation Electronic Products, Baltimore 4, Maryland. Or contact: West Coast—Bendix Radio, 10500 Magnolia Boulevard, North Hollywood, California; Export—Bendix International, 205 East 42nd Street, New York 17, New York.



DFA-70 components (clockwise from upper right): MN-72 Radio Magnetic Indicator, CNA-70 Control Panel, MN-58 Dual Azimuth Indicator, LPA-70 Flush Loop Antenna.

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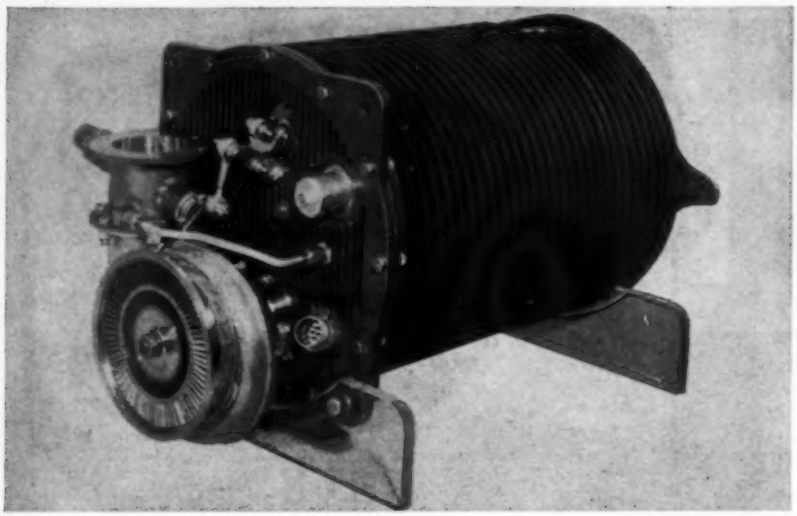
New Products and Processes

HYDRAULIC TURBOPUMP



An aircraft hydraulic turbopump that is said to effect a substantial saving in fuel has been developed by **General Electric Co.'s** Aircraft Accessory Turbine Dept. It also incorporates what is described as an important new safety feature.

Designated Model AP-15, the turbopump generates the hydraulic power which actuates landing gear, bomb-bay doors, control surfaces and other components of jet aircraft by converting the energy of the compressed air from the jet engine to hydraulic power.

The pump is completely automatic, operates only when needed (as opposed to engine-driven pumps) and is 60 lbs. lighter than its predecessor.

Another feature is the elimination of a gear box, since the turbine power is transmitted directly to a high-speed, ball-piston type pump designed to produce 8 gals. per min. of hydraulic fluid at 3,000 psi.

The safety feature has been designed into the turbine wheel, whose lightweight buckets fly off harmlessly well above the normal operating speed but long before the bursting point of the wheel disc itself is reached.

The tiny buckets, each weighing .03 oz., are fastened to the turbine disc by a single shear pin. If an overspeed condition occurs, because of a double failure in the normal controls, the pin breaks and the bucket is safely contained within the turbine wheel housing.

Circle No. 119 on Reader Service Card.

FUEL FLOWMETER

Avien, Inc. has introduced a gravimetric fuel flowmeter whose accuracy is said to be unaffected by variations in density, temperature, viscosity or chemical composition of the fuel and provides true mass flow indications without the use of auxiliary density correcting devices.

The system was designed to permit accurate control of jet aircraft. It consists of two units, a transmitter mounted in the fuel line and a panel indicator. Electronic circuitry housed within the indicators eliminates the need for separate power units.

Operating on the torque principle, the system obtains flow rate signals by means of two turbine wheels within the transmitter. Indicators incorporate integral lighting which meets the "aviation red" chromacity requirements of specifications AN-C-56. The lighting system is designed so that bulbs may be replaced without disturbing the hermetic seal of the indicator.

Circle No. 123 on Reader Service Card.

ELECTRO-MECHANICAL FILTERS

Small (7-oz.) electro-mechanical filters for airborne, mobile and ground-based communications systems, designed to provide the high selectivity required for single sideband operation, are being marketed by the **Radio Corp. of America.**

The filters are said to provide extremely low insertion loss, precision selectivity and high stability over a wide temperature range, from —40°C to 85°C. They measure 1½" x 1¼" x 3¾".

Available are a 250-kc upper sideband type (MFU-250-1) and a 250-kc lower sideband type (MFL-250-1). They have been designed on highly selective i-f stages of single sideband communications receivers and modulation circuits for single sideband transmitters.

Circle No. 106 on Reader Service Card.

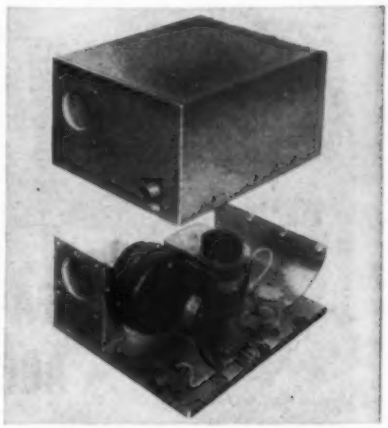
ELECTROSONIC CLEANING UNIT

John B. Moore Corp. is distributing a tank-mounted transducer, manufactured by **Telephonics Corp.,** for ultrasonic cleaning of large and small parts.

The transducer is of the magnetorestrictive type and is said to be effective over the entire area to be cleaned. It is recommended for dual mounting on production line tanks or on separate tanks where portability is desired. Designed for use with Telephonics' electrosonic generator, the unit is the latest addition to the company's line of filter and nonfilter type transducers.

Air cooling elements are shown in the accompanying illustration.

Circle No. 120 on Reader Service Card.



TEMPERATURE INDICATOR

AC Spark Plug Division of General motors has developed an engine temperature indicator for the new Beechcraft Travel Air.

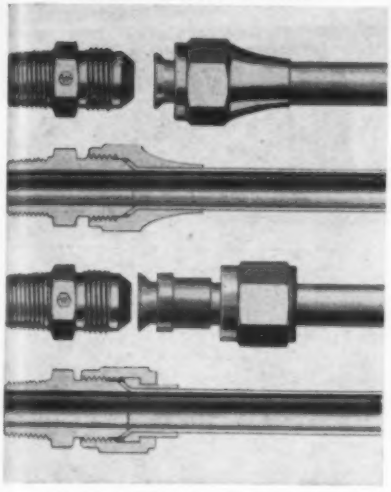
Resembling a spark plug with an extended copper cylinder, the indicator will replace a larger and more expensive thermocouple and is said to have a very high degree of accuracy.

Mounted in the cylinder to obtain a positive temperature reading, the unit transmits the reading via a wire to a gauge on the instrument panel. It has a "negative-coefficient" resistor. Resistance is lowered as engine temperature rises, causing the pointer on the panel to move.

The new AC unit will indicate temperatures up to 600°F. On the Beechcraft Travel Air, an upper limit of 500° is used.

Circle No. 124 on Reader Service Card.

STEEL TUBE FITTINGS



Weatherhead Co. offers a new line of S.A.E. 37° flared steel tube fittings, trade-named Flare-Twin to indicate a choice of two types of fittings throughout the range of its different styles and sizes. There are 3-piece types and 2-piece types, the former said to offer important installation advantages.

The line also includes straight-thread type fittings in most popular styles and sizes for use with the new S.A.E.-approved O-ring boss design.

All of the straight-thread fittings are protected with Weathercote, a black phosphate finish that resists the effects of nonflammable hydraulic fluids, water-base fluids and petroleum-base hydraulic fluids.

Circle No. 108 on Reader Service Card.

CABLE CUTTER

A hose-cutting tool designed to aid rescue crews in disarming ejection seat systems has been developed by **Aircraft Tools, Inc.**

Designated the AT 501C cable cutter, the tool features a swivel head that enables the operator to turn the handle and frame to the best position for fast disarming. The head is self-aligning on the hose or tubing. It will remove a ¾" section of ½" armored hose, stainless steel tubing or wire.

Circle No. 103 on Reader Service Card.

UNITIZED GAS GENERATORS

McCormick Selph Associates has developed a line of pre-packaged gas generators designed to provide power for operation of turbines, pressurization of fluids and systems, actuation of pistons and expandable rings, and ignition of liquid propellants.

As an energy source, these generators combine the advantages of high-energy storage ratio with a reliability factor approaching 100%. Squibs with electrical circuitry are included as integral parts or as separate sub-assemblies available in a wide range of sizes and styles.

The units can be supplied with a wide range of different pressure/time characteristics to suit application requirements. Horsepower outputs range from .01 to 150 and output pressures from 15 to 25,000 psi.

Circle No. 110 on Reader Service Card.

VIBRATION MOUNTS

T. R. Finn & Co. has developed a new series of 210-type Class A vibration mounts for airborne electronic equipment, meeting requirements of MIL-C-172B.

The mounts are designed in three separate load ranges, from 2½ to 5, 5 to 10 and 10 to 20 lbs. and thus are applicable to 90% of the electronic gear now used on aircraft, according to the manufacturer.

Design is basically the Belleville spring type, consisting of two load-carry-

Break-Through Maintenance Cost Barriers with CEE-BEE Specialized Aviation Chemicals

Two major barriers in aircraft maintenance are the man hours required to perform a job and the "out of service" time of the equipment. Cee-Bee aviation chemicals *minimize* these two important cost factors. Field results prove CEE-BEE products and methods require less time and give superior and long lasting results. Our engineers and on the job service representatives will help you solve your maintenance problems. write for free brochure.

CEE-BEE's 1-2-3 exterior cleaning and brightening method is fast and economical. Stops corrosion. Lasts up to 10 times longer than regular polishing methods.

CEE-BEE's products and methods for desealing, structural repair and resealing integral fuel tanks are GUARANTEED! Results show great dollar savings.

CEE-BEE's hot or cold tank engine cleaning virtually eliminates hand cleaning. Gives maximum cleaning – removes stubborn sludges, varnishes and carbon.

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CEE-BEE CHEMICAL CO., INC.
9520 East CeeBee Drive
Downey, California

Circle No. 23 on Reader Service Card.

ing springs, a circular coil spring and two wire mesh pads. It has a natural frequency of 10 cps and a low magnification factor of 1.5 at resonance. This is said to make possible more accurate readings of radar scopes and other sensitive equipment at resonance.

Weighing 3.5 oz., the mounts are available with short or long studs.

Circle No. 121 on Reader Service Card.

WEATHER SIMULATOR

Electric Machinery and Equipment Division of **American Electronics, Inc.** has introduced a new type of ground support weather simulator that will deliver 45°F air at quantities up to 100 lbs. per min., for ground checkoff and maintenance of airborne electronic equipment.

Designated MA-3, the simulator is completely self-contained and is complete with compressor, evaporator, blower condenser and all necessary gauges and controls to provide automatic refrigeration regardless of ambient temperatures. It is towed to the aircraft site and then moved into final position under its own power.

The first shipment of 343 units ordered by the U.S. Air Force is now under way.

Circle No. 178 on Reader Service Card.

CARGO ROPELOCK

Elimination of costly ground time in aircraft cargo loading has been achieved by **General Logistics,** subsidiary of Aeroquip Corp., in the development of its new Ropelock fastener.

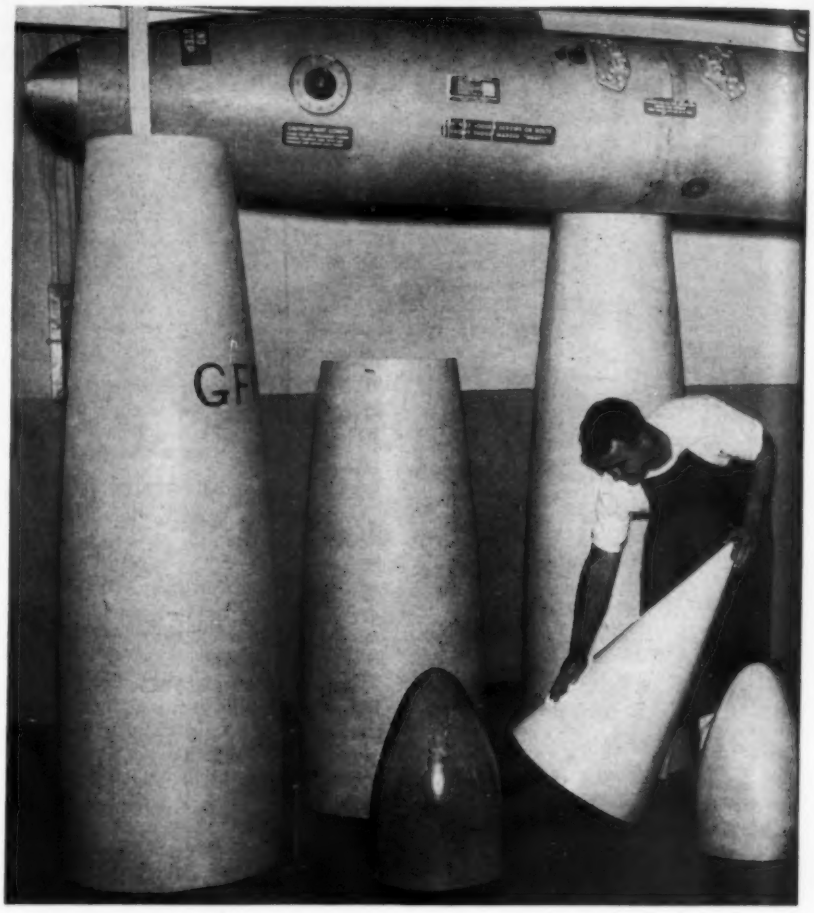
The new design provides a quick and easy method of securing almost any type of aircraft load where medium strength requirements exist. It is designed for use with ⅜" manila or ⅛" nylon rope and is rated up to 1,000 lbs. for nylon and 700 with manila.

The fastener is available in two types, with and without a hook. Threading a unit with rope to suit a particular tie-down assembly takes but a few seconds, and once threaded, Ropelock never requires rethreading.

Standard Ropelock is 4⅜" long, 2" high and ¼" wide and weighs 9.5 oz. Unit with hook attached weighs 1.5 oz. more.

Circle No. 179 on Reader Service Card.

PLASTICS PROCESS



A new plastics process has been developed by **Pastushin Aviation Corp.** after five and a half years of research and development.

Originally conceived as a means of making better external fuel tanks for aircraft, the new product, called GFR (glass fiber resin), now also promises to find wide application in the radar radome field, because of its structural uniformity. This reduces radar beam distortion, a particularly important quality for fire control radomes.

Pastushin is now in experimental production on radomes for Convair, for study for the F-106 (formerly F-102B but with P&W AJ75); for Emerson Electric for the nose of the Convair B-58, and for Boeing for possible application to the Bomarc missile.

Strength feature of the new plastics process was demonstrated in a set of 200-gallon external tanks flight-tested by the Air Force. The plastics tanks were 10% heavier than aluminum tanks of the same capacity, but were 25% over strength. Pastushin also has a development contract from the Air Force for a number of 450-gal. tanks for flight test and then for service test.

Low cost per unit and low cost of tooling are among advantages claimed for the new process by Pastushin. Lead time for tooling also is short, which counts heavily in radome production because of the frequency of change in radomes due to changes in the electronics or aerodynamics or both.

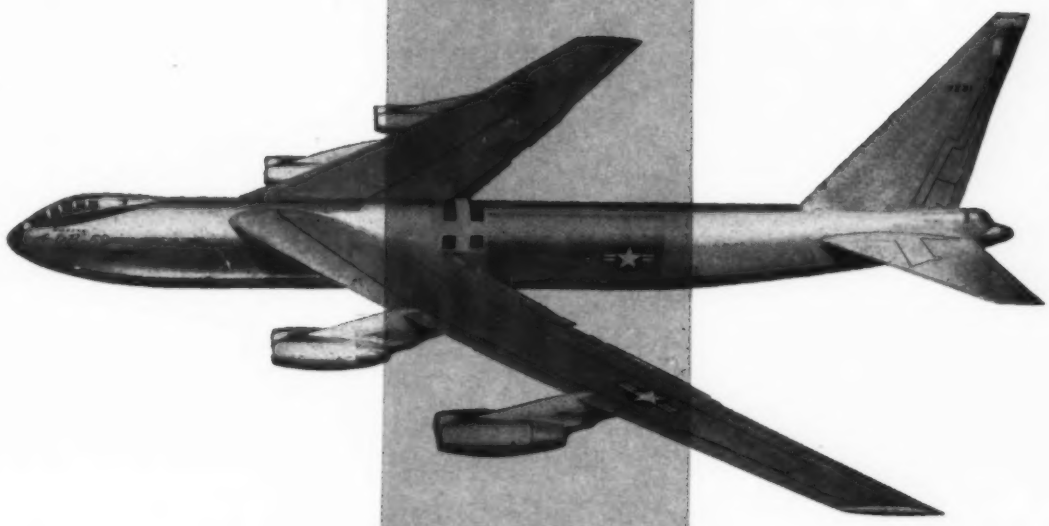
The process by which Pastushin grosses higher physicals for GFR utilizes unique machines and methods arrived at after several years of trial and error. Principal machine is a spinning shroud in which a mold is installed and the rate of glass and resin is automatically controlled. A vacuum bag is then placed in the mold to apply pressure to the laminate. It can turn out 500 pounds per hour. Through means of this process, which is automatic throughout, Pastushin is able to produce reinforced plastics with a very high glass content.

In addition to external tanks and radomes, Pastushin envisions use of GFR for helicopter blades, parachute loop containers, mine sweeping floats and various types of packaging.

Circle No. 61 on Reader Service Card.

More new products on following pages.

for SAC's new B-52 Stratofortress...



Flight Control System—by Sperry

Like every Sperry flight control system developed over the past 40 years, the MA-2 system designed for SAC's intercontinental jet bomber is "tailor-made" for the job to be done.

Providing precision control of the 650-mph Boeing plane during the long hours of navigating to distant targets, the MA-2 also supplies automatic control for the bombing system and flies the bomber during instrument landing approaches.

To meet changing control requirements of the B-52 at various speeds and at altitudes up to 10 miles or more, Sperry engineered a new design concept into the MA-2. Called "parameter control," this new development automatically determines and applies to control surfaces the exact amount of force necessary to execute any maneuver required by pilot or bombardier.

Remarkable as is the performance of the advanced MA-2 system, it is only one of many Sperry automatic flight control systems in the air today. Other Sperry systems are in use on many of the world's leading airlines, on hundreds of business planes and thousands of military aircraft. Tomorrow, new Sperry systems will be flying many of the multi-jet and turbo-prop transports now going into production.

If you have a problem in automatic flight control, Sperry engineers can help you find the right answer. Write our Aeronautical Equipment Division.

H. C. BOSTWICK, Manager of our Aeronautical Equipment Division and twenty-year Sperry veteran. Serving aviation — his experience as pilot, engineer, inventor and manager.

SPERRY GYROSCOPE COMPANY
Great Neck, New York

DIVISION OF SPERRY RAND CORPORATION

BROOKLYN • CLEVELAND • NEW ORLEANS • LOS ANGELES • SEATTLE • SAN FRANCISCO. IN CANADA: SPERRY GYROSCOPE COMPANY OF CANADA, LTD., MONTREAL, QUEBEC

Circle No. 24 on Reader Service Card.

OXYGEN OUTLET

A universal oxygen outlet introduced by **Scott Aviation Corp.** accommodates the three most widely used oxygen mask plug-ins employed in airline, executive and military transports: the AN, Aro and Puritan types.

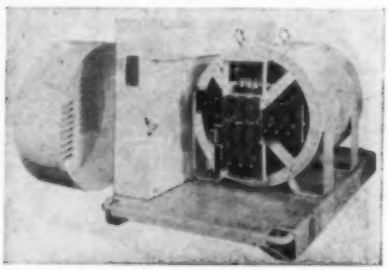
The basic outlet accommodates the Aro plug-in. It may be converted to an AN or Puritan outlet by snapping a small insert into the outlet. Supplied with either AN orifice type of metering or the Scott glass wool adjustable type.

Circle No. 180 on Reader Service Card.

MOTOR-GENERATOR SETS

Electric Machinery Mfg. Co. has introduced 50-kw, 400-cycle motor-generator sets that meet USAF specifications as MD-4 power units.

A two-bearing unit housed in a single frame, the set consists of a 1,200 rpm synchronous drive motor and Uni-core generator. Both motor and generator are rectifier-excited, which eliminates maintenance on rotating exciters.



Input to the sychronous motor is 220/440 volts, 3-phase, 60-cycle. Output from the generator is 120 volts single-phase or 120/208 volts, 3-phase 0.8 power factor and exactly 400 cps.

Circle No. 114 on Reader Service Card.

STAINLESS STEEL RIVET

Cherry Rivet Div., Townsend Co. has developed a stainless steel rivet with a sheer strength of 85,000 psi at 800°F, designed for aircraft structures requiring high strength at high temperatures.

Designated the Cherry 600 rivet, its room temperature shear strength is more than 100,000 psi. Stem and sleeve of the rivet are A-286 stainless steel, heat treated and aged for optimum strength and corrosion resistance.

Circle No. 102 on Reader Service Card.

MINIATURE DC MOTORS

Miniature dc motors or generators of various lengths are available from the **Heinz Mueller Engineering Co.**

Self-aligning sleeve bearings with nylon retainer assure quiet running, but units are also supplied with ball bearings. Stator is the Alnico TV ring type.

Measurements of standard unit are .875″ diameter, 1.625″ length and .098″ shaft diameter. Other units with 1″, 1.25″ or 1.438″ are available.

Circle No. 100 on Reader Service Card.

TANK UNIT TESTER

Telectro Industries, Inc. is producing an MD-2 capacitor-type fuel quantity gauge tank unit tester that combines a servo-operated capacitance bridge and what is described as an extremely accurate megohm meter.

The capacitance bridge is designed specifically to measure capacitances to values of 5,000 micro-microfarads in three ranges in increments as low as 0.1 micro-microfarad. Measurements are read directly through use of a main and vernier dial.

The megohm meter measures re-

A little pull in the right place . . .

the ROBINSON wire twister

Aircrafts' Who's Who Reports

A cross section of the Who's Who in the aircraft industry—including Douglas, Allison, Fairchild, Grumman, Martin, Republic, Canadair Ltd., Pratt and Whitney among a host of others — is reported to have reduced engine wiring time as much as 66%. This saving is effected by the use of the new Robinson Wire Twister, an improved model of the ones that have seen service with the army, navy and airforce since 1943. Improvements include the exclusive diagonal jaw design that permits easier access to hard-to-reach areas, and clamps a vice like grip on the wire by pulling it into a 30° bend thus delivering added leverage for twisting.

In addition to the greatly increased engine wiring speed, users attest to improved shop safety — fewer skinned knuckles and bruised fingers.

Besides their production line assignments, Robinson Wire Twisters readily adapt in the shop to bench work, on radio and radar equipment, on magnetos, carburetors, instruments and sub-assembly work of all kinds.

List price is $19.50. Write for fully descriptive literature to Ralph C. Robinson Company, Dept. M, Box 3494, 2516 Crosby Way, North Sacramento 15, California.

Circle No. 25 on Reader Service Card.

. . . saves ⅔ the usual wiring costs

the ROBINSON wire twister

NAVY FLIGHT SETS NEW RECORD

Allison Turbo-Prop-powered "Tradewind" opens new era in vital Pacific Fleet service

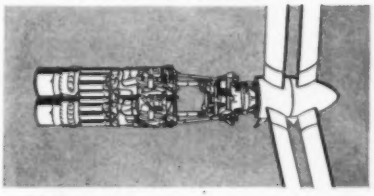
A few weeks ago the U.S. Navy opened a new chapter in aviation history when its giant aerial tanker – the Convair R3Y-1 Tradewind – set a new trans-pacific speed record for water-based aircraft. On its maiden round-trip flight from Alameda, California, to Keehi Lagoon, Honolulu, Air Transport Squadron TWO [VR-2] firmly established the Navy's long-standing belief in turbo-prop power as the jet age's most flexible and efficient power source. On its return flight the Tradewind covered the nearly 2,500 miles over water span in 6¾ hours, far surpassing the record on this route for this type aircraft.

Powered by four Allison twin power section turbo-prop engines driving contrarotating Aeroproducts Propellers, the Tradewind boasts nearly 24,000 horsepower–can lift its 80-ton weight from the water in 30 seconds, climb quickly to cruising altitude and cover more than 2,000 miles nonstop at speeds in excess of 350 miles per hour.

What makes this astounding aerial feat possible is the development of a whole new concept of powered flight–the culmination of 10 years of research by the Navy, Convair and Allison. It required the solving of one of the most complex engineering challenges in aviation history–perfecting a gas turbine engine of advanced design and mating it with a six-bladed contrarotating propeller.

The R3Y-1 Tradewind will refuel in flight eight jet fighters–*four at a time* –at speeds of more than 350 miles per hour. This new addition to the vast Pacific Fleet, the R3Y-1 will provide a vital service to our fast carrier task forces, further extending the range and striking power of the Navy's mighty air arm.

ALLISON DIVISION OF GENERAL MOTORS CORPORATION
Indianapolis, Indiana



R3Y-1 demonstrates versatility of Turbo-Prop power in jet-age transportation

Record-breaking Navy R3Y-1 is powered by four T40 Allison Turbo-Prop engines like this–each having twin power sections driving contrarotating Aeroproducts Propellers. Both power sections in each engine give the R3Y-1 full power for rapid take-off and climb to cruising altitude. To gain best fuel economy for cruising, one power unit may be shut off entirely, allowing the other to operate at its most efficient setting. Either power section operates all six blades contrarotatively.

ALLISON
TURBO-PROP POWER
VERSATILE POWER FOR JET-AGE FLIGHT

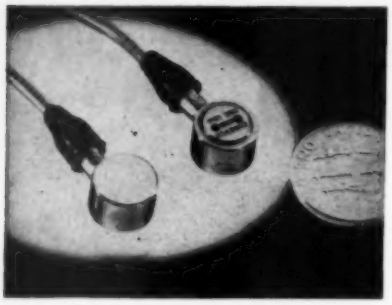
sistances to values of 10K megohms in one range, featuring a log scale for higher accuracy.

Power source required for the tester is 115v, 400 cps. However, the unit is also available for 60 cps operation. It is supplied with nine accessory cables for connecting to all types of fuel gauges.

Circle No. 107 on Reader Service Card.

TURBULENCE GAUGE

A turbulence gauge designed to measure turbulent pressures in wind-tunnels along skin surfaces of model structures has been developed by **Endevco Corp.** It is used in the study of fluid flow in gas and hydraulic lines and in microphone applications as well.



Designated Model 2503, the gauge provides 40 millivolts sensitivity per psi minimum, with a pressure range of 0 to 10 psi. Natural frequency is above 50 kc and frequency range is 5% from 2 cps to 10,000 cps.

The gauge is ⅜" in diameter and ¼" thick. It may be flush-mounted with wax, O-rings or retaining rings. Literature is available (Bulletin 105).

Circle No. 111 on Reader Service Card.

VG RELAY

A VG relay series for missile and aircraft applications, developed by the Electronics division of **Elgin National Watch Co.,** is said to have exceptional vibration and shock resistance.

This subminiature relay, designed to meet military specifications MIL-R-5757C, has a vibration rating of 15 Gs from 55 to 2,000 cps and a shock rating of 100 Gs. It measures less than ¾ cu. in., weighs 1.3 oz. and operates in temperatures ranging from —65°C to 85°C. On special order, it is available for operation at 125°C.

Coil specifications are for standard operation at 24-29 volts dc and a maximum coil voltage of 38 volts dc continuous.

Circle No. 122 on Reader Service Card.

MOBILE ASPHALT PLANT

A mobile asphalt plant designed for maintenance and resurfacing of runways, landing strips and taxiways is offered by **Wylie Mfg. Co.**

Designated the Model 1520 Roadmaster, the machine delivers 15 to 20 tons of hot asphalt mix an hour and has a capacity of 400 gals. It is available with gasoline or diesel engine.

The gasoline engine is a Model VF-4 Wisconsin 4-cylinder, 4-cycle, 25 hp unit with clutch reduction, oil bath cleaner and fuel pump.

Circle No. 101 on Reader Service Card.

SYNCHROTEL TRANSMITTERS

A new line of pressure Synchrotel transmitters developed by the **Kollsman Instrument Co.,** subsidiary of Standard Coil Products Co., Inc., achieves what is described as a significant reduction in response time. The instruments are used in high-speed aircraft and guided missiles for transducing pressure values as electrical signals.

Lighter and more compact than previous Kollsman models, the transmitters are also said to have far less internal static volume. They are used with air and navigation data computers as

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BACKED *by Scintilla Division field service specialists.*

BACKED *by efficient distributors.*

THE FINEST ELECTRICAL CONNECTOR MONEY CAN BUY!

When you specify Bendix Scinflex* electrical connectors you can be certain of receiving the finest possible service from a product that is the result of advanced engineering design and the most modern production techniques.

Significant proof of the outstanding performance and reliability of these connectors is given by the fact that, within a relatively short period of time after the start of manufacturing operations, Scintilla Division of Bendix has achieved a recognized position of prominence in the electrical connector manufacturing industry.

Further reassurance is offered the user by the fact that Bendix Scinflex electrical connectors are backed by a nation-wide field service organization and by especially trained, well-staffed and adequately stocked distributors.

AVIATION PRODUCTS: Low and high tension ignition systems for piston, jet, turbo-jet engines and rocket motors . . . ignition analyzers . . . radio shielding harness and noise filters . . . switches . . . booster coils . . . electrical connectors. *REG. U.S. PAT. OFF.

Bendix SCINTILLA DIVISION of Bendix AVIATION CORPORATION SIDNEY, NEW YORK

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AIRCRAFT FUEL CONTROL SYSTEMS and COMPONENTS

Here at the Chandler-Evans plant in West Hartford, young, aggressive and imaginative engineers join forces with seasoned specialists who contribute valuable experience gained in years of significant achievement. Here, RESEARCH works in completely equipped, modern laboratories to provide the advanced data on which ENGINEERING bases always newer, finer designs. And PRODUCTION converts these designs into the precision fuel control systems and aircraft components that have played a vital part in establishing so many of the important "firsts" in aviation's progress.

When you work with CECO, your projects are in good hands!

To Young Engineers

Chandler-Evans offers *careers* in Creative Engineering. Here — for aggressive young men capable of original thinking who want to see their ideas realized — are opportunities to work under experienced specialists on important developmental projects that will provide full scope for your abilities and help you grow in your profession. Write directly to our Chief Engineer, Mr. A. M. Wright.

CECO *Chandler-Evans*

CHARTER OAK BOULEVARD, WEST HARTFORD 1, CONN.

Makers of Jet Aircraft Accessories Produced Today to Meet Tomorrow's Progress

Circle No. 27 on Reader Service Card.

well as with flight and engine control units. Applications to problems of ultrasonic speeds and high altitudes have been substantially increased.

Overall weight has been reduced to about one pound, one-third less than previous models.

Circle No. 112 on Reader Service Card.

VACUUM TRANSFER RELAY

Jennings Radio Mfg. Corp. offers a Type JGF-RE2 single-pole, double-throw vacuum relay for antenna transfer switching applications in high-altitude aircraft.

The relay has been welded into a rugged gas-filled steel housing so that it can be mounted in exposed locations. Ceramic bushings and corona rings make possible 5-kva operating voltages at altitudes up to 50,000 ft.

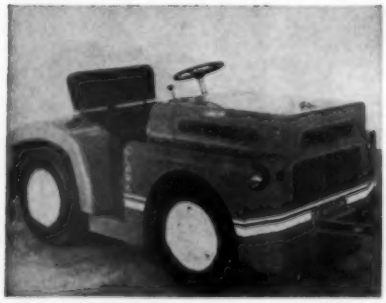
Continuous current rating at 24 mc is 10 amps. rms. According to the manufacturer, the relay will not be damaged if it is accidentally switched "hot."

Circle No. 104 on Reader Service Card.

TOWING TRACTOR

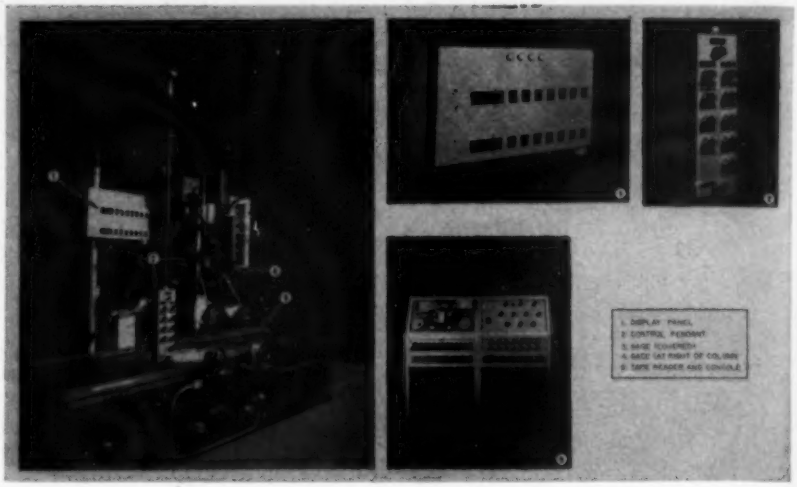
A towing tractor with 8,000 lbs. maximum starting drawbar pull and a low silhouette free of protruding accessories, the Clarktor 80, has been introduced by **Clark Equipment Co.**, Industrial Truck Div. Fluid coupling is standard equipment.

The tractor is powered by a 6-cyl. Chrysler gas engine of 230 cu. in. displacement. Its synchromesh transmission provides four speeds forward and one reverse. Maximum forward speed is governed at 16 mph. Overall length is 107", width 69" and height, to the top of the steering wheel, 56½". It turns on a 146" radius.



Circle No. 109 on Reader Service Card.

TAPE CONTROL SYSTEM FOR TOOLS



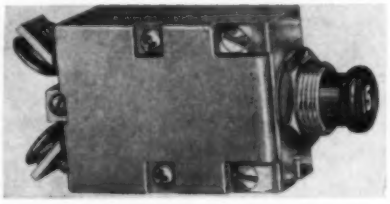
Autonetics, a division of North American Aviation, has developed a tape control system that makes standard machine tools fully automatic and is said to achieve levels of precision, speed, flexibility and economy unobtainable with customary manufacturing methods.

Called Numill, the system is designed to reduce the cost of producing tools and parts in small quantities. Here's how it operates:

The control tape is placed on a tape reader that converts recorded instructions to electrical signals which in turn direct the movement of the machine. An instruction panel "tells" the operator what material and tools to use.

The Numill system can be used to automate many kinds of machine tools such as lathes, boring and contouring mills and grinders. Studies leading to its development started four years ago when North American reviewed its airframe operations to determine possible applications for tape-controlled equipment.

Circle No. 105 on Reader Service Card.



CIRCUIT BREAKER

Mechanical Products, Inc. is producing a new circuit breaker (Series MP-700) weighing only 1.5 oz. that is said to operate satisfactorily when subjected to conditions of extreme heat and cold.

The miniaturized breaker makes it unnecessary to operate several circuits on one breaker. A number of major aircraft manufacturers are testing the breaker for use in the newest military jet aircraft and in the latest transports on the drawing boards or under construction.

Literature describing MP-700 series is available to aviation engineers.

Circle No. 113 on Reader Service Card.

Products Briefs

• **Shur-Lok Corp.'s** Shur-Klinch spacer is described as a new design in spacers for fastening to honeycomb material, lightweight but with high columnar strength. Available from stock in aluminum, steel or corrosion-resistant steel, made for either flat or flush-head application.

Circle No. 115 on Reader Service Card.

• **Thermo Electric Co.** has developed a multi-point pyrometer controller that permits automatic temperature control of 4 to 10 separate units with one instrument. It is said to combine the accuracy of a null balance measuring circuit with the speed of an electronic control system.

Circle No. 116 on Reader Service Card.

• **Haydon Switch, Inc.** offers a hermetically sealed potted switch, with actuator, designed primarily for use in aircraft and missile applications. Main feature is the threaded actuator plunger guide sleeve that permits mounting the switch actuator button flush or extended any distance from the mounting board up to ⅞".

Circle No. 117 on Reader Service Card.

The nation's first jet transport-tanker is in the air

First production model of the Boeing KC-135 jet transport-tanker is shown above on a test flight. The Air Force has announced that production will be stepped up to a rate of 20 per month earlier than originally planned.

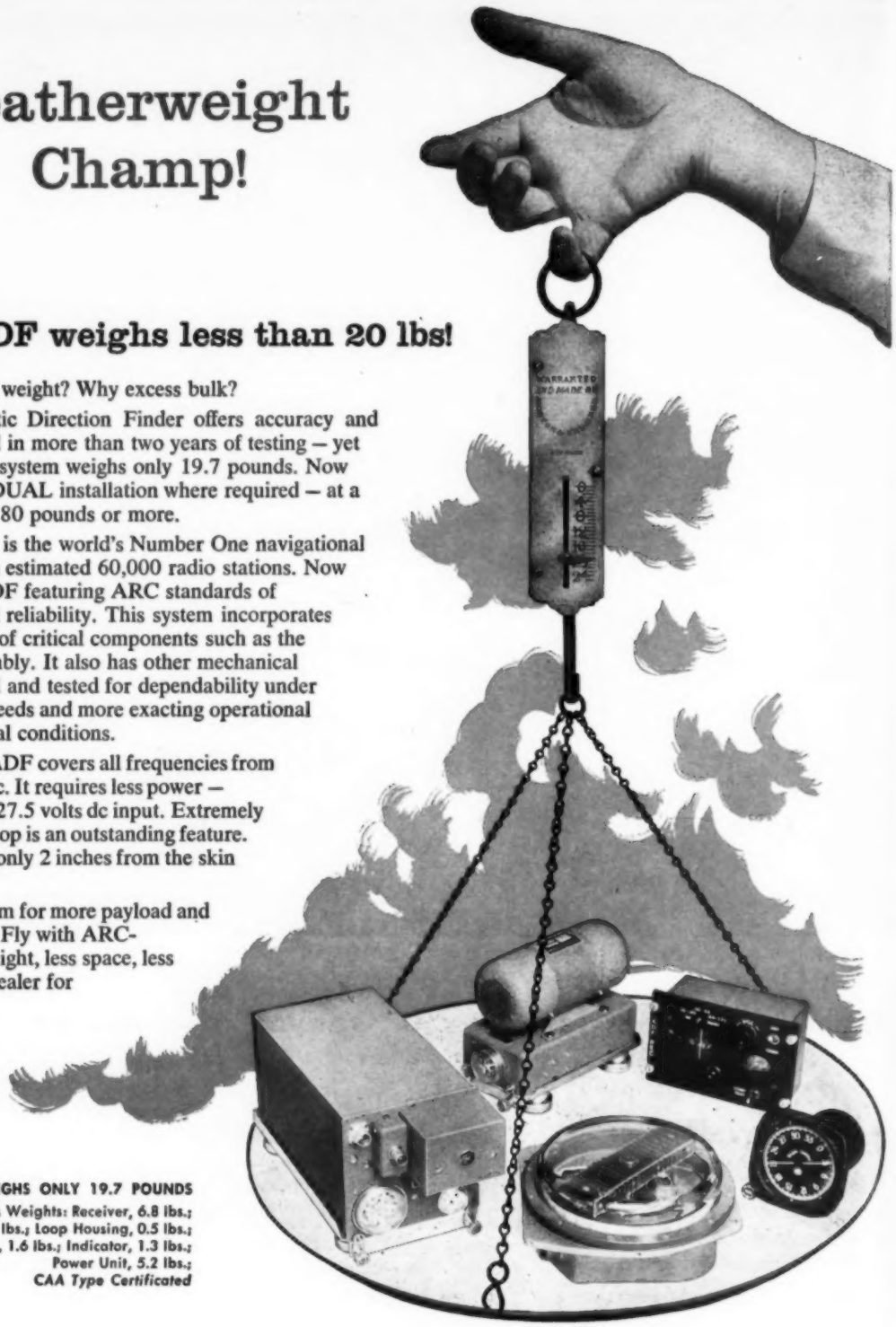
The KC-135 is a sleek, swept-wing craft capable of speeds in the 500-mile-an-hour range. It will refuel jet bombers and fighters while flying eight miles or more above the earth—at speeds best suited to jet flight. It is a versatile aircraft, convertible in a matter of hours from tanker into a military transport. As a transport it offers the full potential of jet-age operation for carrying personnel and critical cargo.

Design of the KC-135 is based on that of a prototype model which already has behind it more than two years of intensive flight testing. The KC-135 incorporates many design advances that could come only from such a flight test program. This experience background enabled Boeing to cut production time on the first KC-135 by 20 per cent under normal estimates for a first production model.

The new Boeing transport-tanker also benefits from the knowledge Boeing has gained developing and producing more than 1400 B-47 and B-52 multi-jet bombers, the backbone of the Strategic Air Command's nuclear weapons carrier forces. In the not too distant future, this team of revolutionary Boeing bombers will be joined by the newest Boeing jet, the KC-135 transport-tanker.

BOEING

Featherweight Champ!



ARC's ADF weighs less than 20 lbs!

Why carry dead weight? Why excess bulk?

This Automatic Direction Finder offers accuracy and reliability proved in more than two years of testing – yet the entire 5-unit system weighs only 19.7 pounds. Now you can have a DUAL installation where required – at a weight saving of 80 pounds or more.

The ADF still is the world's Number One navigational aid, usable on an estimated 60,000 radio stations. Now you can have ADF featuring ARC standards of performance and reliability. This system incorporates hermetic sealing of critical components such as the entire loop assembly. It also has other mechanical features designed and tested for dependability under today's higher speeds and more exacting operational and environmental conditions.

The Type 21 ADF covers all frequencies from 190 kc to 1750 kc. It requires less power – only 2.8 amps at 27.5 volts dc input. Extremely low drag of the loop is an outstanding feature. Housing extends only 2 inches from the skin of the aircraft.

Now make room for more payload and other equipment. Fly with ARC-reliability, less weight, less space, less drag. Ask your dealer for complete details.

TYPE 21 ADF WEIGHS ONLY 19.7 POUNDS

Component Units Weights: Receiver, 6.8 lbs.; Loop, 4.3 lbs.; Loop Housing, 0.5 lbs.; Control Unit, 1.6 lbs.; Indicator, 1.3 lbs.; Power Unit, 5.2 lbs.;
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Circle No. 28 on Reader Service Card.

West Coast Talk . . . By Fred S. Hunter

- **Douglas DC-9 project very much alive.**
- **Irony in Navy's shelving of F5D.**

RUMORS are afloat that Douglas has shelved the DC-9 small jet transport. Not true. The project is still very much alive. Just a slow-down at the moment. One reason for this is the political situation in the Middle East. Like other aircraft companies, Douglas has to be prepared to go military overnight. Another factor in stretching out this study project—and study project actually is what the DC-9 has been and still is—is the engine problem. The Boeing 727 is up against the same problem. P&W's J52 may be the eventual answer, but this engine is still down the road . . . and so are the DC-9 and the Boeing 727. But in the long run—projecting into the 1960s—Douglas and Boeing may sell even more of the smaller-size jet transports than they will DC-8s and 707s.

Hunter

• • •

What most impressed Bob Six, Continental Air Lines president, in a flight from Seattle to Los Angeles in the Boeing 707 prototype, was the extent of the air traffic at the 35,000-foot level. "F-100s, B-47s, everything," exclaimed Six. "I had no idea there was so much traffic." The flight, incidentally, was Six's first in the Boeing jet, which Continental has ordered. "A $23,000,000 ride," observed Six.

• • •

It's ironic that the Navy had to shelve production on the Douglas F5D because of the shortage in the budget. Four years ago, Ed Heinemann, chief engineer of Douglas-El Segundo, arguing the advantages of the lightweight, simplified, low-cost A4D, foresaw increased budget troubles looming from rising costs and greater design complexities. Now, as he predicted, these budget troubles have arrived, and one of his own aircraft is an early victim. It's a pity, too. Real good Mach numbers have been demonstrated by the XF5D in flight tests.

• • •

New saucer-like radome on the WV-12 picket plane Lockheed is now testing houses a slowly-revolving scanner, which is 40 feet or more, and is said to extend the range of the WV2-'s pickup three times . . . Rick Helicopters is setting up a CAA approved helicopter school at San Francisco . . . Flying Tiger Line is mapping plans to use its forthcoming Lockheed Model 1049Hs in Atlantic charter work next summer . . . AiResearch and Boeing have been working with CAA in determining degree of protection to be required against turbine wheel failure in auxiliary turbine installations in the Boeing 707.

• • •

Donald W. Douglas, president of the Douglas Aircraft Co.; Ted Conant, senior v.p., and T. E. Springer, v.p. and general manager of the El Segundo division, all become eligible for retirement next spring. But this does not mean they will. There has been speculation from time to time that Mr. Douglas might decide to ease off a little by relinquishing the presidency—to Conant or to Arthur E. Raymond, v.p.-engineering—but remain as chairman of the board. There has been no real hint, however, as to when, or if, this might happen.

• • •

Ed Converse, president of Bonanza Air Lines, is wrestling with his financial conscience. Bonanza could make use of an additional DC-3 or two while awaiting delivery of the Las Vegas carrier's new Fokker 27s. But the thought of paying $135,000 or $140,000 for airplanes no better than those Bonanza is now flying and cost only $40,000 has kept him from signing on the dotted line.

• • •

H. I. Thompson Fiber Glass Co.'s "Refrasil" is now being produced in Great Britain under a royalty arrangement, which will undoubtedly net the U.S. manufacturer a pretty penny. "Refrasil" is the trade name for a fibrous silica batt developed by Thompson for jet engine insulation. It has a range of usefulness of up to 1,800°F and will not fuse until about 3,100°F. Thompson's basic patents are cross-licensed to Owens-Corning, with which it works closely, but latter has no rights to important improvement patents obtained by Thompson.

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People

MANUFACTURING

Bell Aircraft Corp.'s new Aircraft Div. executives: **John W. Rane, Jr.,** director of engineering and sales; **George D. Ray,** chief engineer; **Stanley W. Smith,** chief project engineer; **John J. Weisbeck, Jr.,** contracts mgr.; **Raymond C. Sears,** director of quality; **Norman A. Lomas,** purchasing mgr. **Maurice J. Coughlin** named director of procurement for Weapon Systems Div. and **John T. Bailey,** director of quality.

Dr. James E. Lipp promoted to corporate director of development planning for Lockheed Aircraft Corp.

KING

Dr. Donald D. King elected vp-research for Electronic Communications, Inc., subsidiary of Air Associates, Inc.

Scott W. Donaldson appointed Avien, Inc. representative in Washington, D. C.; **Joseph M. Brian** will direct sales of Avien products in Canada.

G. C. "Red" Anderson named chief of operations of Meteor Enterprises' Aircraft Div.

Dr. Raymond L. Garman elected exec. vp and technical director, and **James W. Murray** elected exec. vp and gen. mgr. of General Precision Laboratory Inc.

William Sendell appointed general-products production mgr. of Bendix Aviation Corp.'s Red Bank div.

Andreas J. Darlson appointed eastern district mgr. of Nickel Cadmium Battery Corp.

J. R. White promoted to sales mgr. of the aviation products div., Fenwal Inc.

Walter J. Hyatt has opened an office in Beverly Hills, Calif., as a manufacturers' representative agency.

THOMPSON

Robert S. Thompson named gen. sales mgr. for The Cornelius Co.

France Q. Wilson named mgr. of turbine and control sales of Solar Aircraft Co.

Menasco Mfg. Co. makes following appointments: **B. R. Fondren,** exec. vp and continuing as treas.; **Thomas J. Tormey,** sec'y; **Frank G. Fenger,** vp-manufacturing; **Jack I. Hamilton,** vp-sales; **Glenn E. Vescelus,** vp-engineering.

Daniel W. Wildfong named project engineer for Temco Aircraft Corp.'s engineering dept.

Archie N. Colby is new gen. sales mgr. for Greer Hydraulics, Inc.; **Leonard H. Seeman** named asst. gen. sales mgr. District mgrs. are: **Joseph A. Sellers,** eastern; **Lyman A. Bullard,** midwest; **Fred Gottschling,** southwest; **Ernest O. Gibson,** North Hollywood.

John B. Ward named director of extensive reliability program at Northrop Aircraft, Inc.

Gene H. White appointed sales mgr. of the Leach Corp.'s pressure switch div.

Peder W. Larsen named mgr. of government projects of PSC Applied Research Limited.

AIRLINE

Ogden C. Gorman appointed European sales mgr. of Seaboard & Western Airlines.

Jackson F. Long named southwest division mgr. of sales for United Air Lines.

MAY

Jack F. May appointed vp-sales for TAG Airlines.

A. Wallace Owen appointed sales development officer, Canada, for British Overseas Airways Corp.

Sidney W. Weaver appointed asst. to Pan American World Airways' Latin American Division attorney.

Ronald J. Yates is Qantas Empire Airways' technical representative for Boeing 707 program.

J. Robert Carter appointed administrative asst. to the president of Riddle Airlines.

O. F. (Ollie) Stern is vp-cargo sales of AAXICO Airlines, with headquarters at the Idlewild Airport.

BEARDSLEY

Henry W. Beardsley named passenger sales mgr.—U.S., Pan American World Airways.

G. Robert Simmons appointed Midwest sales rep. for British West Indian Airways.

Joe D. Kirkpatrick named mgr. of airline interline and travel agency sales for Continental Air Lines in Chicago.

Edward D. Nicholson, regional affairs mgr. and assistant to the president of United Air Lines, retired.

Richard L. Kohler appointed food service supervisor for Transocean Air Lines at Oakland, Calif.; **Martha Jane Ekstrand** named chief stewardess.

Capt. O. M. Gove named asst. mgr. of flying, international, for Trans World Airlines.

KLM Royal Dutch Airlines names eight senior vice presidents: **J. A. Bach,** operations; **V. H. L. Dubourcq,** field organization; **T. M. van Erp,** planning; **A. H. van Gelder,** finance; **J. C. van der Klott,** marketing; **J. Luymes,** engineering and maintenance.

GOVERNMENT

J. N. Cunningham promoted to asst. to the Air Materiel Command Director of Maintenance Engineering, filling post vacated by **Victor J. Meyers,** retired.

HONORS

Douglass F. Johnson, president of the Aircraft Engineering and Maintenance Co. of Oakland International Airport, elected Chairman of the Board of the Aircraft Service Assn.

Lt. Gen. Christian F. Schilt, Director of Aviation USMC and Asst. Chief of Naval Operations for Marine Aviation, selected Man of the Month by the National Aviation Club.

Maj. Gen. John M. Weikert (USAF, ret.) elected chairman of the Aircraft Industries Assn.'s Export Committee for 1957.

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Among them are:

air-conditioning

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The Garrett Corporation is also applying this engineering skill to the vitally important missile system fields, and has made important advances in prime engine development and in design of turbochargers and other industrial products.

Our engineers work on the very frontiers of present day scientific knowledge. We need your creative talents and offer you the opportunity to progress by making full use of your scientific ability. Positions are now open for aerodynamicists ... mechanical engineers ... mathematicians ... specialists in engineering mechanics ... electrical engineers ... electronics engineers. For further information regarding opportunities in the Los Angeles, Phoenix and New York areas, write today, including a resumé of your education and experience. Address Mr. G. D. Bradley

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International Aviation

By Anthony Vandyk

All the world's long-stage routes will soon have tourist fares as a result of IATA's decision to permit tourist services on the Europe-South America route starting early next year. This is the only major long-haul run that still has only one class of accommodations—first class.

Despite the availability of tourist class on most long routes there continue to be many short international runs where only first class accommodations are offered. There are no tourist services on such popular routes as Miami-Havana and Miami-Nassau although tourist accommodations are available on flights from New York to both Havana and Nassau. The same anomalous situation prevails on flights to Jamaica; New York services offer tourist as well as first class but out of Miami it's first-class only.

• **Furthermore,** there's no tourist flight from Miami to Port au Prince, Haiti, or Ciudad Trujillo, Dominican Republic, although the latter has tourist service from New York. Compania Dominicana de Aviacion, however, flies from Miami to Ciudad Trujillo at a fare of $66 one-way, slightly less than the IATA fare of $78. For passengers insisting on using IATA carriers the cheapest way of getting to Ciudad Trujillo from Miami is to fly non-stop to San Juan, Puerto Rico, for $43 tourist class and then double back to the Dominican capital for $27.

Quite often it pays to fly to the Caribbean via San Juan. There are now three classes of accommodations offered between New York and San Juan—first, tourist and thrift. The thrift fare of $52.50 one-way, one of commercial aviation's biggest bargains, contrasts with $66 tourist and $100 first-class. Eastern's thrift flights are operated with 78-seat DC-4s, while PAA uses DC-4s and DC-6Bs seating "at least" 78 passengers.

The lowest fare of all between New York and San Juan is offered by Trans Caribbean Airways—$49. The company advertises "Douglas four-engine flights exclusively" and "complimentary snacks" at this fare. The snag about this service, however, is that it's only operated twice-weekly while Eastern and PAA offer far greater frequencies, six and eleven flights weekly, respectively.

Another bargain fare to a sunshine island is the $99 tourist round-trip fare from Washington to Bermuda. This is exactly the same as the fare from New York so the airlines in effect present the passengers with a free roundtrip from Washington to New York.

Brazilian Airlines Move Toward Consolidation

The Brazilian airline industry has been reduced to four groups of companies and further consolidation seems likely. The carriers which have either merged or agreed to work together are: (1) REAL-Aerovias-Nacional-Aeronorte-Itau; (2) VARIG-VASP; (3) Panair do Brasil-Loide Aereo; and (4) Cruzeiro do Sul-TAC-SAVAG.

It seems likely, Brazilian sources report, that the Cruzeiro group will probably join one of the other three groups, probably Panair do Brasil-Loide Aereo.

The recently announced associations between Panair and Loide, on the one hand, and VARIG and VASP, on the other, are not actual mergers. Nonetheless, the arrangements made between the carriers pave the way for ultimate merger.

The airlines involved will work together to seek the elimination of duplicated ticket offices, radio and maintenance facilities, etc. They will also investigate the possibilities of interchanging equipment and crews.

MANUFACTURING BRIEFS

Italy's Aerfer is designing an advanced version of the Ariete, the initial model of which is now under construction and is built around two Rolls-Royce turbojets—a Derwent and a Soar. The Ariete 2 will have a 6% wing, Bristol Orpheus turbojet and a Spectre Junior rocket in the tail . . . **Dassault's** Mirage 3 lightweight fighter, powered by an Atar G with afterburner developing over 11,000 lbs. thrust, has started its flight test program. The French fighter's speed is stated to be over Mach 1.5 . . . The **Bristol** Britannia 301, prototype long-fuselage model, last month started tropical trials in Africa. By mid-November it had logged about 200 hours in the air since it made its first flight on July 31.

CASA-HFB-209 Super Azor is the designation of the version of Spain's Azor which is under consideration for construction in Germany by **Blohm & Voss.** It would accommodate 46 passengers and two Napier Elands would give it a cruising speed of 310 mph. . . .

AIRLINE BRIEFS

Australian National Airways is offering six of its DC-3s for sale at about $100,000 each. Additional DC-6Bs have been delivered enabling DC-4s to be switched to several routes hitherto operated with DC-3s and hence creating a redundancy of DC-3s . . . **BOAC** is to improve its London-West African services in 1957 by introducing Stratocruisers on some first-class schedules and installing fully-reclining seats in its first-class Canadair Argonauts . . . **SABENA Belgian World Airlines** will open a helicopter service from Brussels to Paris in March. There will be five roundtrips daily with S-58 equipment . . . **Scandinavian Airlines System** has set February 23 as the inaugural date for its polar service to Tokyo. There will be two DC-7C flights weekly operated via Anchorage.

Lufthansa is making plans to open a route to the Far East with Tokyo as the probable terminal . . . **Swissair** has decided against reopening its route to South Africa until 1960 at the earliest . . . **British West Indian Airways** holds 51% of the shares in the newly formed **Leeward Islands Transport Co.,** which will provide air services between the smaller Leeward Islands.

Turkey's flag arline, formerly known as **Deviet Hava Yollari (DHY)** has been reconstituted as a limited liability company and in future will be known as **Turk Hava Yollari (THY)** . . .

Assembling Comet Fuselages

One end of de Havilland's Hatfield fuselage shop is now jigged for Comet 4 and 4A fuselage assembly. Hatfield and Chester plants will start deliveries of the jet transports in 1958.

New Propjet Global Mobility for TACTICAL AIR COMMAND

IT'S A HEAVY-DUTY HAULER

IT'S A PUSH-BUTTON CARGO DROPPER

IT'S A LIFE-SAVING AIRBORNE AMBULANCE

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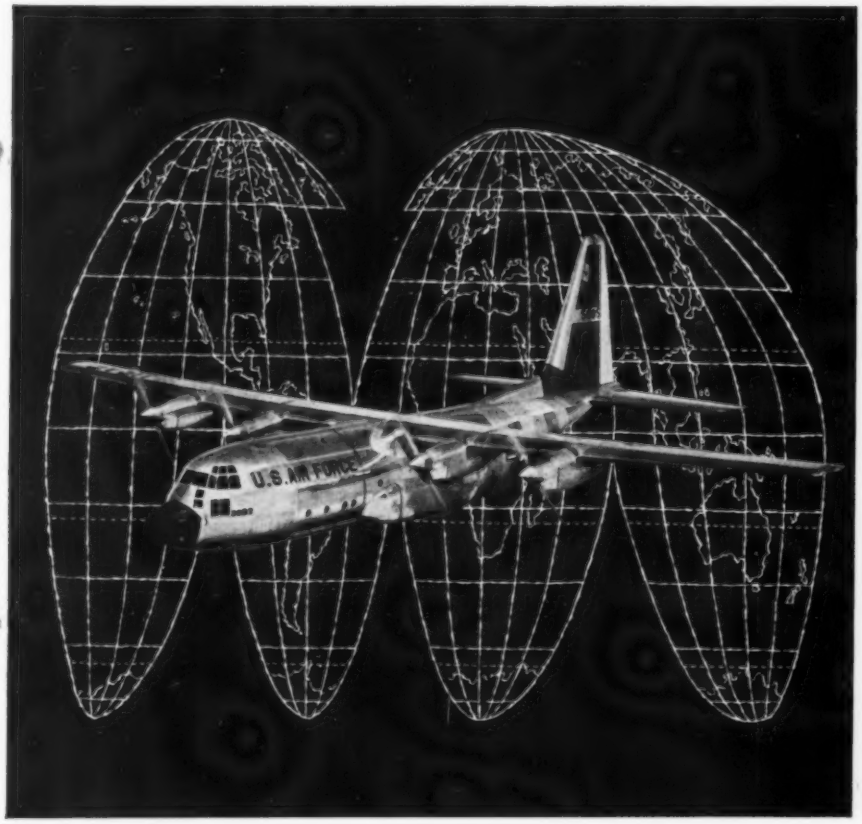

C-130 HERCULES

Delivered to 18th Air Force, Ardmore AFB

Moving anything, any time, any place on earth is the responsibility of Tactical Air Command's 18th Air Force. The new Lockheed C-130 Hercules–propjet "strongman" of the USAF, first assigned to the 463rd Troop Carrier Wing–does this job faster, better, at lower cost than any other combat carrier now in service. The Hercules is powered by four Allison T-56 propjet engines.

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World's Largest Turbo Transporter

Pours Out Its Power Through SPECO Transmissions

This mammoth turbine-powered helicopter of "1001" uses is the Vertol YH-16A. The production version will be able to carry up to 12 tons and can whirl into action without warm-up to achieve an air speed of over 150 mph. Transferring the output of its turbine into a smooth, steady flow of propelling power is the job of the forward and aft transmissions produced by SPECO, the Steel Products Engineering Division of Kelsey-Hayes.

The manufacture and assembly of gears and gear assemblies which insure dependable, maintenance-free performance such as required in the Vertol YH-16A is a Speco specialty, one of 40 years standing in service to the aviation industry.

Rotor transmission from YH-16. The transmissions, clutch assemblies, synchronizing shafts and drive shaftings are produced by Kelsey-Hayes in accordance with Vertol's design specifications.

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*15 PLANTS / **Automotive:** Detroit and Jackson, Michigan; McKeesport, Pa.; Los Angeles, Calif.; Windsor, Ontario, Canada **Aviation:** Jackson, Michigan; Springfield, Ohio — 2 plants — (SPECO Aviation Division); Utica, New York — 4 plants — (Utica Aviation and Tool Division) • **Agricultural:** Davenport, Iowa (French & Hecht Farm Implement and Wheel Division)*

Circle No. 31 on Reader Service Card.

Aircraft Products, Inc. in Production With Tactair Pneumatic Autopilot

Production of a new three-axis autopilot, pneumatically operated, has been announced by the Aircraft Products Co. of Bridgeport, Pa. It will be produced by the Tactair Autopilot division.

Under development for three years, the new autopilot weighs less than 10 pounds installed. Installation for the Beech Bonanza was CAA-approved two years ago. Next installations will be in the Cessna 180 and Piper Tri-Pacer. CAA approvals for the light twins are expected within six months.

The autopilot derives its pitch and roll control from sensing units on a modified artificial horizon and heading control from the directional gyro. The two modified gyro instruments are supplied with the autopilot as part of the installation kit.

• **The Tactair unit** features a heading lock operated by a small button on the command control that engages the course selector incorporated in the directional gyro. The autopilot is said to fly a predetermined course indefinitely.

An inherent "heading memory" brings the plane back to the preselected heading after the pilot overrides the autopilot manually and releases the controls.

Command Control

The pilot controls the flight aid with a small command control on the instrument panel or throttle quadrant. Straight flight and turns are controlled by a knob on the command control or with the directional gyro when the heading is locked.

A supplemental trim control is incorporated for straight flight. Level flight, climb or descent are controlled by another knob.

The heading lock and memory characteristics have been found to be particularly advantageous in VOR or ILS tracking. With the lock set, the pilot can still set the course selector to the heading indicated either on his VOR receiver or for the ILS track.

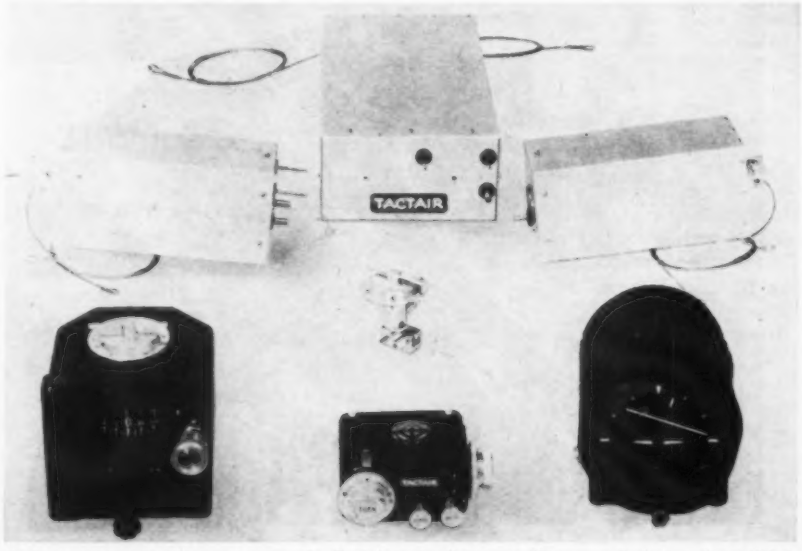
Drift is compensated by setting a corrected heading and the Tactair autopilot compensates the correction.

• **Heart of the pneumatic system** are air or suction gauges that are tied into the directional gyro and artificial horizon. The gap of air over the suction gauges is varied by cams that move as the gyros register changes in aircraft attitude. This produces variations in amount of suction that give the sensing advice to the pneumatic amplifiers which in turn relay the data to the servos of the Tactair system. Suction comes from the vacuum pump of the engine and sensing units operate at four inches of mercury.

The servos or bellows, which move the controls, operate on an eight-inch vacuum and can exert a pull of as much as 125 pounds. The suction gauges relay the variations caused by changes in maneuver or direction and, through valving, create variations in the suction fed to the servos.

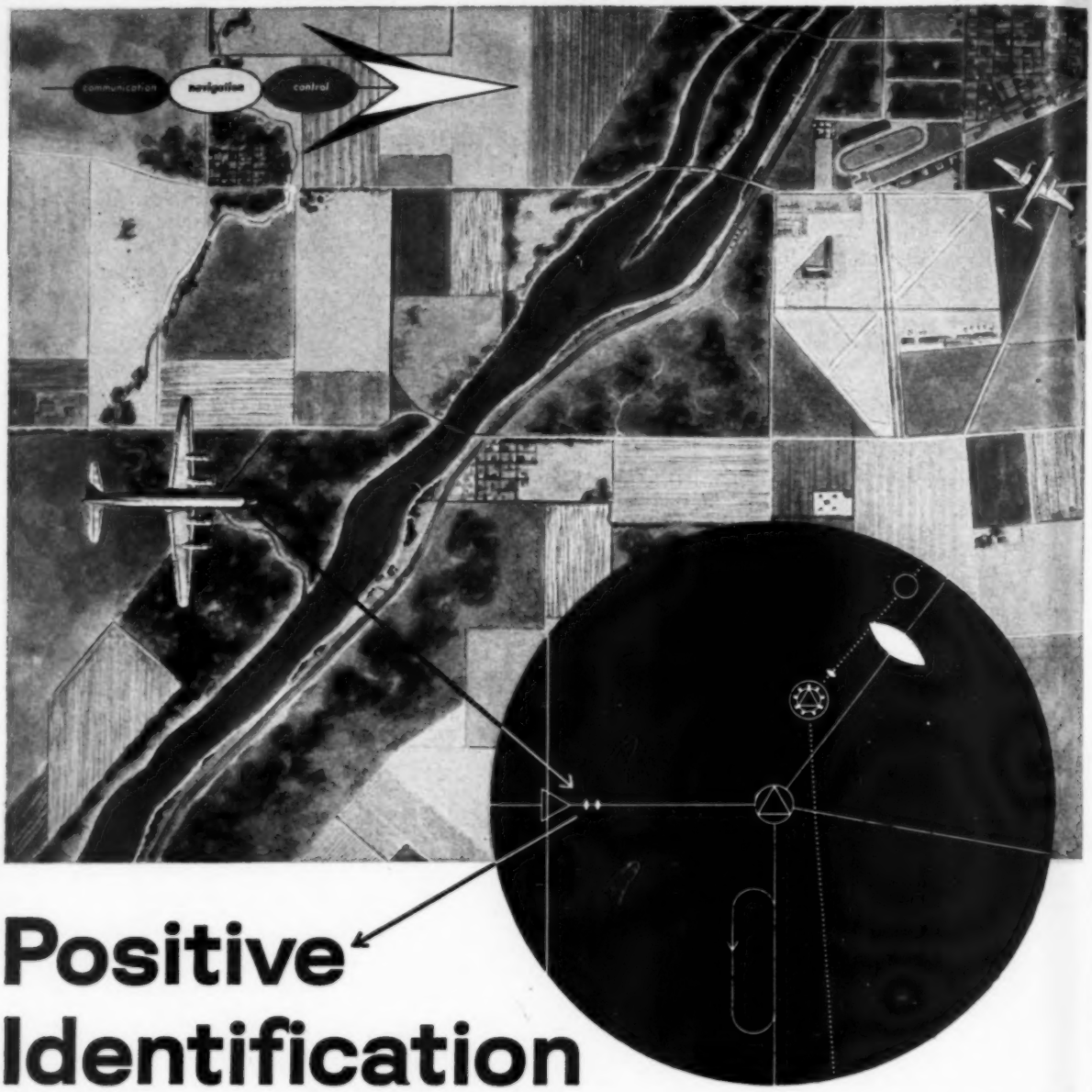
• **The Tactair eliminates** the need for follow-up linkages to report back to the autopilot when a control movement has been accomplished. Linkage of the servos is direct, without clutches.

Basic components of the system include: command control, measuring



Basic components of new pneumatic Tactair autopilot are: (foreground, l. to r.) modified directional gyro with heading card installed; command head control; modified artificial horizon; (center) master shut-off valve; and (top, l. to r.) pneumatic servos for left aileron, elevator, right aileron. Installation weight is 10 pounds, exclusive of two modified gyro instruments which are replacements for original aircraft equipment.

Typical Beechcraft Bonanza installation of Tactair pneumatic autopilot. Command head control is placed in center of panel.



Positive Identification

Collins 621A-1 ATC Transponder of Collins Airborne Electronic System

Instantly replying to the Interrogator of the Air Traffic Control surveillance radar, Collins 621A-1 reliably identifies you through all weather. Selection of up to 64 different reply codes are available to the pilot. Transmitted information will be displayed on ATC radar. The 621A-1 is contained in a ½ ATR case, modularized, weighs only 25 pounds. Receiver on 1030 mc and is crystal controlled to assure reception of interrogations. Transmitter frequency 1090 mc, stability ±3 mc. Equipment will be available for use in CAA evaluation of ATC Interrogator-Transponder System.

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3½-in. wide x 2 in. high and 2½ in. deep; and three control boxes that house the basic sensing and amplification valving and the bellows-type servos.

A separate rudder control system is in development and is expected to be ready in late 1957. It will be designed to be incorporated into the present system.

The original development was undertaken for the U.S. Navy three years ago by a research and development company headed by William Harcum at Wings Field, in Ambler, Pa. Aircraft Products took over the design and production rights earlier this year.

Long-range Forecast of Aviation Needs Can't Be Precise, Consultant Warns

Management consultants retained by the General Aviation Facilities Planning Group to make a survey of the general aviation field on which to base a 20-year forecast of its needs are not too optimistic about the accuracy of such a survey.

If a 20-year forecast comes within plus or minus 25% accuracy, it would be "plenty good," William Pocock, a spokesman for Booz, Allen & Hamilton, told the annual meeting of the Aviation Distributors and Manufacturers Assn. in Chicago. He added that his firm expects to come within 10% on present requirements.

Among the objectives of the survey, Pocock declared, was the aim of "bringing down to earth" the "visionary statistics" heretofore available.

He noted that the planning group is bound to "some secrecy" until Presidential aide Edward P. Curtis has integrated the data into his overall program. But he did reveal that approximately 100,000 questionnaires returned in the two-day mass count of general aviation movements at 900 airports in October represented about one-third to one-half the total operations in the U.S.

Preliminary findings, Pocock said, have borne out his company's "suspicion" that hub areas were the main problem in traffic density. He anticipated that the completed survey would be at the White House no later than February 1. The presentation will be "very factual," he added, and designed to keep general aviation "in the air."

The 20-year forecast, he said, will cover: (1) numbers of aircraft and types; (2) purposes of aircraft uses; (3) type of owners; (4) qualifications of pilots; (5) location of aircraft; (6) effect of weather, darkness and seasons on aircraft operations; (7) overall geographic impact on aircraft use.

Dearest Peg:

It's with heavy heart and tear-fogged optics that I write you the tragic news from Southwest Airmotive: After five glorious, glamorous years, SAC this month ends its world-famous "girl ads." However, I'm cheered by a pledge that their 1957 Silver Jubilee ads may be even more exciting--and not entirely un-feminine. I'm cheered, too, by five years of wonderful memories of all the lovely ladies who've smiled out at me from the nation's aviation magazines. God bless 'em every one! And a very special Christmas blessing to my own 20-year-old, 5'4", 115 lb., green-eyed, blonde daughter.

Love,

Daddy

NOTE: Daddy's right. This is it! Our grand finale here shows a princess representing each of our five series: L. to R., Sally Merrill, Dee Brock, Peggy Martin, Nancy Boyd Gibson, and Barbara Allard. AS A MEMENTO FOR OUR COURTLESS FRIENDS, WE HAVE A FREE BROCHURE WITH ALL 12 "LETTERS FROM DADDY". THE SUPPLY IS LIMITED. WRITE NOW FOR YOURS!

SOUTHWEST AIRMOTIVE COMPANY • LOVE FIELD • DALLAS, TEXAS

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Piper Receives ADMA's First Annual Award

William T. Piper, founder and head of Piper Aircraft Co., was selected by the Aviation Distributors & Manufacturers Assn. for its first annual award. He was honored for making the greatest individual contribution to the advancement of general aviation.

Presentation was made at the annual banquet by outgoing ADMA president Robert Northington. Banquet speaker was Wayne W. Parrish, editor and publisher, of AMERICAN AVIATION Publications.

New officers for 1957 also were installed at the final session, including J. Turner Moore of Reading Batteries as president. New vice president for manufacturers is Dee Hollowell of Continental Motors, Frances Hines of Airwork continues as vice president-distributors. New directors named were Bill Gillespie of Airwork, Norman Roberts of Sky Stores, C. A. Degucz of Electro Autolite and Paul Miller of Weems System of Aviation.

Neuschwanstein Castle near Fuessen, Germany

Save 4 ways...use *TWA* to Europe!

Now TWA saves passengers almost $100 over former round trip tourist fares to Europe! TWA's new 15-Day Sky Tourist Excursion Fare to London is only $425 . . . round trip from New York! Allows two glorious weeks abroad!

For those taking the family to Europe, the savings amount to hundreds of dollars through March 31st, 1957. The husband pays full fare, wife and children (12 through 25) fly for much less! Enjoy TWA Super-G Constellations . . . luxurious First Class or thrifty Sky Tourist.

Special TWA Immigrant Fares are effective through March 31st, 1957, also. Save 40% in bringing relatives to this country! Fast, comfortable TWA Sky Tourist Constellations. Finest service. Complimentary meals! Purchase tickets here or abroad.

Now . . . without extra charge! Added luxury on all TWA First Class flights overseas . . . TWA's Sleeper Seats! Full-length for stretching out . . . for cat-naps or hours of refreshing sleep!

And in this country . . .
NEW! TWA SERVICE TO TUCSON, ARIZONA!

Fast, TWA Sky Tourist service from New York, Los Angeles, Chicago and other key cities. TWA Constellation comfort . . . gracious service . . . warm TWA hospitality!

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U.S.A. - Europe - Africa - Asia

CAB'S EARLY HOPES for speeding the general passenger fare investigation are waning. The complex case has run into its first major legal snag. Problem involves the question of whether CAB can compel an airline to produce confidential information used in obtaining financing for equipment programs. Western Air Lines, resisting a subpoena, is in the forefront (see page 19). But numerous other airlines are also balking. Question may find its way into the courts.

●

TWO BIGGEST DOMESTIC ROUTE CASES which should be decided by CAB next year: (1) Great Lakes-Florida case, with a Chicago-Miami route as the plum, and (2) the Phoenix Service case.

●

ALTHOUGH EMPHASIS has been on the government's plans for operating rules for jet transport aircraft, CAB is becoming increasingly aware of the need for economic studies. No one knows at this point what impact jets will have on airlines' fare structure. One reason the Board is asking Congress for a substantial budget increase in fiscal 1958 is its need for much larger safety and economic staffs.

●

WHITE HOUSE APPROVAL of a New York-Nassau route for Pan American World Airways is expected momentarily. The White House returned the case to CAB late last month, but only for minor language changes. No change was requested in the Board's 3-2 recommendation favoring PAA over Eastern, National and Mackey.

●

LOCAL SERVICE LINES REMAIN BITTER in their assertions that CAB's mail pay policies have made is impossible for the industry to make money during the past 10 years. With no liberalization of policies in sight, locals may take pains to acquaint Senators and Congressmen with their plight. It was a concerted drive in Congress that got them permanent certificates over CAB objections.

●

IMPORTANT MEETING on ground handling of airline jet transports is scheduled for next spring in Seattle. Airlines expect to see demonstrations of equipment for towing, engine starting, etc. Boeing 707 will be used in the tests. Meeting is an outgrowth of the October session of Air Transport Association's ground equipment and maintenance facilities subcommittees (AMERICAN AVIATION, Nov. 5). At that time, airlines told equipment manufacturers they wanted to see some hardware demonstrated within six months.

●

EUROPEAN AIRLINES hope to be able to modify the IATA plan for introduction of "third class" accommodations on the Atlantic in the spring of 1958. They don't oppose the fare ($417.60 round-trip New York-London), but disagree with the accommodations proposed. Third-class planes would have very high-density seating and no galley facilities. Thus, to use them for normal tourist or first-class flights would necessitate extensive reconversion. Somewhat better facilities on third-class would make it easier to rotate equipment between various classes of services, airlines say.

TRANSPORT AVIATION

British Policies Imperil Independents

More liberal new charter needed, says industry spokesman; carriers unable to plan purchase of new aircraft.

By ANTHONY VANDYK

A WARNING that the British independent airline industry may perish unless the government gives it a more liberal charter has come from the chairman of the British Independent Air Transport Association, G. H. Freeman.

The BIATA official, alluding to a statement by the Minister of Transport and Civil Aviation that the independents are restricted to limited operations and low revenue fields with operating permits pegged to short-term periods, declared:

"So long as we are restricted in this manner, the purchase of new aircraft is impossible." He asserted that "if we are to have new aircraft we must be able to use them gainfully—that is in the international field."

• **Freeman pleaded** for integration of some sort between the independents and the nationalized airlines (BEA and BOAC) which would allow the latter to concentrate on the high-density routes where foreign competition has to be met. He implied that nationalized airlines should yield some of their routes between Britain and points in British overseas to the independents or that the government should allow the privately owned airlines to compete with them on such routes.

French independents are allowed to compete with Air France on trunk routes from France to French overseas territories as well as operating feeder systems in these territories.

British independents are allowed to parallel the nationalized airlines' routes to British overseas territories but under such arduous conditions that they can only do so with the greatest of difficulties. These conditions are basically that a lower class of service must be provided than that offered by the nationalized airlines' tourist class. Furthermore, frequency is restricted on the independents' routes which compete with those of BEA and BOAC.

In order to fulfill the conditions forced on them by the government the independents must operate at lower fares and with inferior aircraft than those of the nationalized airlines. This means that until BOAC starts operating turboprop equipment the independents must operate non-pressurized aircraft—DC-3s, Vikings and Yorks—on the so-called "Colonial coach" services to points in British territories overseas.

When BOAC starts Britannia operations it is probable that the independents will be allowed to step up to the Hermes, a four-engine pressurized aircraft sold by BOAC a few years ago because it was uneconomic.

The independents, therefore, under present government policy, are restricted to the use of inferior aircraft for their routes that compete with the nationalized carriers. For their other routes they can use what type of equipment they like. These other routes, however, are in most cases of such marginal importance that there is little point in buying modern aircraft for their operation.

British independents use de Havilland Herons for many short-haul domestic operations and services to the European continent. This is a Dragon Airways' aircraft at Amsterdam.

Unattractive Routes

The types of international service that the corporations can fly on a scheduled basis are those not already operated by the nationalized airlines. In other words any routes that the nationalized airlines do not find worthwhile operating are available to the independents. Domestically the independents may only fly routes which will not divert a substantial amount of traffic from BEA's operations.

• **The other fields** open to the independents are likewise of types spurned by the nationalized airlines as being unprofitable. These include the operation of inclusive vacation tours (the passenger pays a lump sum for both transport and accommodations). These operations are highly seasonal and present a big problem to the carriers: how to use the aircraft on these flights from October to May?

The independents are also allowed to operate all-cargo flights on routes where the nationalized airlines do not want to do so but they are not given mail to carry on such flights. This was one reason for the downfall of Air-

Remember him?

Maybe you saw him. He was in magazines coast to coast.

A stewardess was helping make his business trip more comfortable, and we had this to say:

"Pretty soft, eh? Flying rested and relaxed on a trip instead of putting up with tense hours driving on crowded highways. Well, why not? All you do is leave your car at home, take a fast plane, rent a bright, new Powerglide Chevrolet Bel Air or other fine Hertz car at your destination."

Now—what's in it for you?

Just this. By encouraging people (millions of 'em) to leave their cars at home, we encourage *more* airline passengers. *More profits* for you. Naturally, we stand to profit, too. So that's why we say: let's work together. Why don't you mention the "idea" of renting a car in *your* advertising? Hertz Rent A Car, 218 South Wabash Ave., Chicago 4, Illinois.

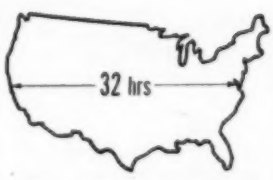
More people by far...use

HERTZ

Rent a car

Shrinking Map of U. S. Shows One Reason for Air Travel's Leadership today

Here is how the nation looked, in terms of air travel time, less than 30 years ago—in 1927, when United Air Lines began the first transcontinental service:



In 1933, when United introduced the nation's first all-metal, low-wing twin-engined transport, the map began to shrink rapidly:

Five-mile-a-minute DC-6s went into service in 1947, and the airline time map looked like this:

Then in 1954 came the DC-7, providing coast-to-coast nonstop service, and here's what happened:

Jet airliners, by 1959, will have an even more striking effect on the nation's time map:

In terms of travel time, the dimensions of our nation have been greatly reduced by the progress of commercial air transportation. The shrinking maps at left help explain why the airlines' influence on the social and economic life of this nation has been incalculable in its benefits.

It also helps to explain why there has been such a phenomenal growth in the popularity of air travel. Today the airlines account for more passenger miles than any other form of intercity transportation – in fact, the nation's *four* largest intercity public passenger carriers are now airlines.

We in the industry expect the volume of air travel to double in the next ten years. That estimate of growth – as many estimates of the past have been – may be conservative. Whether it is or not, you can be sure that United Air Lines and the industry will give you even more speed, convenience, comfort and dependability in the years ahead.

W. A. Patterson

PRESIDENT
UNITED AIR LINES

UNITED AIR LINES

work's short-lived transatlantic cargo service which started and ended last year.

The independents may also operate helicopter services on routes already served with fixed-wing aircraft but, with the lack of economic helicopters, the prospects for such operations are bleak. Finally, the privately-owned airlines may operate scheduled vehicle-carrying services.

Car-Ferrying Activities

It is in the car ferry field that the British independents have perhaps become best known. Silver City Airways and Air Charter Ltd. carry thousands of cars each year between Britain and continental Europe. Nonetheless, these operations are highly seasonal and finding work for the aircraft during the winter months is a real problem.

The independents also carry substantial quantities of tourists to Continental Europe on short overwater flights. Passengers travel from London to the English coast by road and are flown over the water to France where they continue their journey to Paris by road or rail, all part of coordinated operations by surface and air carriers. The independents are not, of course, permitted to compete with BEA by operating air services between London and Paris.

• **The most remunerative work** performed by the independents is contract charter operations for the British military services. During the recent Middle East trouble nine privately-owned companies were operating the airlift in the area. A normal part of the operations of the larger independents is flying British military personnel and their dependents to such points as Gibralter, Malta and Singapore. For these operations such aircraft as Hermes, Yorks, Vikings, DC-3s and even Tudors are used. The reason that the operators have no more modern aircraft than these obsolete types is not financial, although at one time this was a prime cause of the lack of progress by the British independents. Finance today is readily available since most of the companies are now part of the empires of British shipping concerns.

Handley Page Hermes are the biggest aircraft operated by the British independents. They are used for military contract operations and are fitted with rearward-facing seats.

Future Too Uncertain

The reason that the independents are chary of buying new aircraft is the uncertainty as to their future in the commercial field. Some of them ordered Viscounts but then sold them once it became apparent that the government would not let such equipment be used on the "Colonial coach" services. There are a few independents with modern aircraft on order but they are the exception rather than the rule.

Several of the privately-owned airlines have been holding back on ordering new aircraft in the hope that dollars might become available for the purchase of U.S. equipment. Prospects of a change in attitude by the Bank of England are remote although there seems a good chance that more reasonably modern U.S. transports will soon be available against sterling payment in the used aircraft market.

• **The government** seems to be increasingly aware of the independents' problems. There is tacit recognition of the reserve transport fleet that the independents provide for emergency purposes. But the British government is unsure of how to give the independents an improved status in the commercial field without reducing the well-being of the nationalized airlines.

Despite the government's desire to see the independents thrive, if the present procrastination continues, the shipping lines which have injected new life into the independents in recent years may well be tempted to reconsider whether they should continue their investments in the airline industry. ◆◆◆

Fleets of Leading British Independents

Air Charter Ltd.—two DC4s, two Yorks, eight Tudors, five Bristol 170s.
Air Kruise (Kent) Ltd.—six DC-3s, three Bristol 170s.
Airwork Ltd.—four Hermes, seven Vikings, four Bristol 170s, three DC-3s, two Consuls, Doves, and Austers.
Aquila Airways Ltd.—one Short Sunderland, four Short Solents.
B.K.S. Air Transport Ltd.—five DC3s, three Vikings.
Cambrian Air Services, Ltd.—two DC-3s, two Herons, two Doves, two Rapides.
Derby Aviation Ltd.—one DC-3, two Marathons, two Rapides, one Gemini.
Dragon Airways, Ltd.—three Herons, one Viking.
Eagle Aviation Ltd.—sixteen Viking Mark 1-Bs, two DC-3s.
East Anglian Flying Services, Ltd.—three Doves, three Rapides.
Hunting-Clan Air Transport, Ltd.—four Yorks, nine Vikings, four DC-3s, three Viscounts.
Jersey Airlines—three Rapides, seven DH Herons.
Lancashire Aircraft Corp., Ltd.—two DC-3s, three DH Rapides, three Airspeed Consuls, one Auster, one DH 86, one Proctor, one Tiger Moth.
Manx Airlines, Ltd.—four Bristol 170s, three DH Rapides.
Morton Air Services, Ltd.—seven Doves, three Consuls, one DH Rapide.
Scottish Airlines (Prestwick) Ltd.—three Yorks, one DC-3.
Silver City Airways, Ltd.—seventeen Bristol 170s.
Skyways, Ltd.—nine Hermes, nineteen Yorks, three DC3s.
Transair, Ltd.—ten DC-3s.

Woolman Criticizes Airline 'Specialists'

Expansion efforts of "specialists" in the airline industry—local service, all-cargo, tour, and non-sked operators—were criticized recently by Delta Air Lines' president C. E. Woolman.

"The local carriers now seek authority to strengthen themselves through invasion of the medium-range trunkline markets; the freight carriers have successfully sought authorization to add express and mail to their cargoes; the tour specialist seeks greatly expanded authority; and the so-called non-scheduled carriers which originally advised the Board that their operations with 'smaller size aircraft' would be 'localized' in nature are now operating four-engine transport aircraft in transcontinental service in direct competition with certificated carriers ...," Woolman said in an Atlanta speech.

Woolman also urged elimination of the transportation tax, asserting that this levy causes corporations to turn to private aircraft which "can be charged off against the federal income tax as an expense" while the normal 10% tax is simultaneously saved.

What's Behind Split in Nonsked Ranks

By WILLIAM V. HENZEY

What had been little more than a skirmish between two rival non-scheduled airline associations appears to have grown into a full-fledged battle for power, more business, and perhaps survival. Contestants are the Aircoach Transport Assn., which has been raked for six weeks by a management dispute, and the Independent Military Air Transport Assn., which has drawn new life from ACTA's internal troubles.

Two months ago, ACTA outweighed IMATA in terms of members, number of available aircraft, and gross business. But with the transfer of four former ACTA members to IMATA early this month, the disparity in sizes of the two groups was reduced and the odds on obtaining future business practically equalized as between the two organizations.

Perhaps of more long-range significance, IMATA can now claim as many members "with a future" as can ACTA. This is a reference to member carriers which have been recommended for continued operating rights by the Civil Aeronautics Board staff. Each of the organizations now has nine such members.

Precipitated by Heacock Move

Behind these developments, of course, is the move on October 29 of a group headed by Amos E. Heacock, which assumed management control of ACTA. A seven-man board of directors and ACTA president A. J. Rome resigned when the Heacock group said it had sufficient votes to create a new "emergency management team."

The emergency team consisted of Ralph S. Cox, president of U.S. Overseas Airlines; Donald Hoirup, Washington representative for the Trans American Airlines group; and E. J. Averman, of Regina Airlines. They were appointed to serve until ACTA's general membership meeting which was held in Washington during the week of November 26.

• **Opposition to that group** rallied behind former president Rome. In a prepared statement, they blamed ACTA's financial difficulties on the companies that assumed control on October 29. Further, they argued that ACTA deficits were incurred prior to Rome's service as president and that such deficits were substantially reduced during Rome's service.

With all this and more before them, ACTA's members sat down at the Nov. 26 general membership meeting to decide on the future. Four of the companies, owners of approximately 18 aircraft, resigned at the outset and joined IMATA immediately. They are General Airways, Los Angeles Air Service, Meteor Air Transport, and Modern Air Transport.

ACTA's remaining members then voted on an apparently important item advocated by the Heacock-Cox group, namely, to reduce the number of ACTA directors from seven to five. Heacock earlier had told AMERICAN AVIATION that a seven-man board was "too unwieldy." His proposal was passed and the following were elected to the new five-man board: Cox, Chairman; Fred R. Atkins (Central Air Transport); George Patterson (Great Lakes Airlines); Irving "Buck" Mansfield (Aviation Corp. of Seattle); and Averman.

The meeting failed to produce a new president or a new slate of officers. Instead, Cox said ACTA's management will be in the hands of "at least two directors" who will remain in Washington at all times. He said that situation will prevail for "at least thirty days."

In addition, a traffic committee has been set up consisting of Hoirup, Mansfield and Atkins.

• **There are no indications** yet as to how IMATA may work former ACTA officials into its management setup. In addition to Rome, other principal ACTA officials who resigned were Kendall K. Hoyt, public relations and sales promotion director, and Roland W. "Mike" Walsh, who formerly had charge of ACTA's Airmove Control Board.

Also, the presidents of the four companies which transferred from ACTA to IMATA were members of ACTA's late seven-man board of directors. They are O. L. "Bob" Morrow, Meteor; John Becker, Modern; Gus Callas, General; and Kirk Kerkorian, Los Angeles.

Military Business the Key

Both ACTA and IMATA rely heavily on military charter business. They also have been authorized by CAB to act as clearing houses for commercial charter operations by their members. Both are non-profit organizations and derive their revenues from commissions paid by member carriers.

ACTA is considered both a trade and an operations organization. IMATA primarily is an operations organization. A third group, however, may figure to handle trade activities for the revived IMATA. That group is the Supplemental Air Carrier Conference headed by Washington attorney John J. Klak.

• **Prior to the recent dispute,** ACTA had 30 member carriers with approximately 87 airplanes of various types but mostly of the C-46 and DC-4 class. IMATA had eight members with a total of 32 planes, also mostly C-46s and DC-4s.

After the transfer of the four ACTA members to IMATA, however,

CAB Gets Firsthand Look at Jet Transport

Four members of Civil Aeronautics Board, on a visit to west coast aircraft manufacturers, flew from Seattle to Los Angeles in the Boeing 707. They were among a group of 18 CAB personnel on the flight. Board members are in front row with A. M. "Tex" Johnston, Boeing chief of flight test. From left: Vice Chairman Joseph P. Adams; Johnson; Member Harmar D. Denny; Chairman James Durfee, and Member Chan Gurney.

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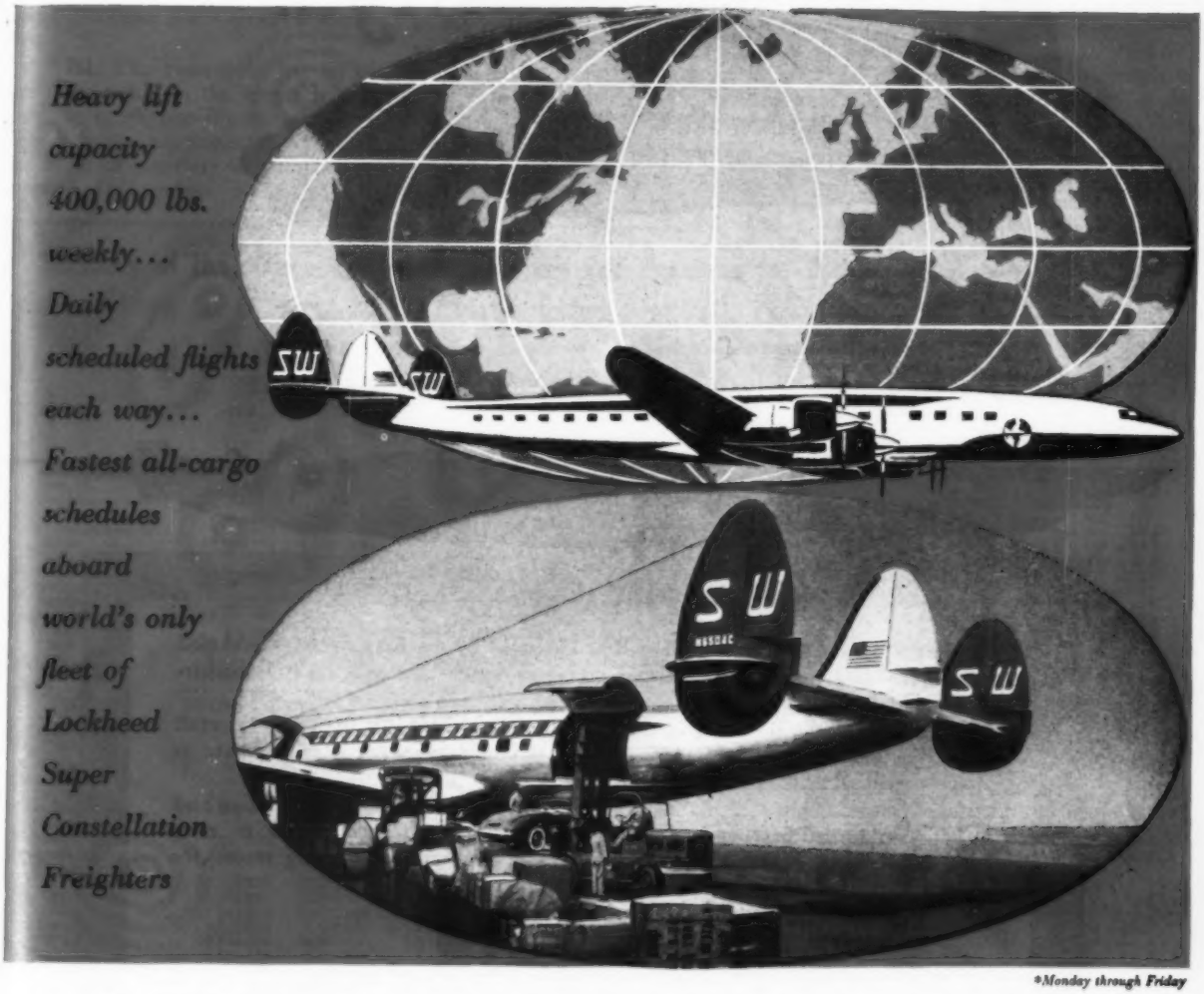

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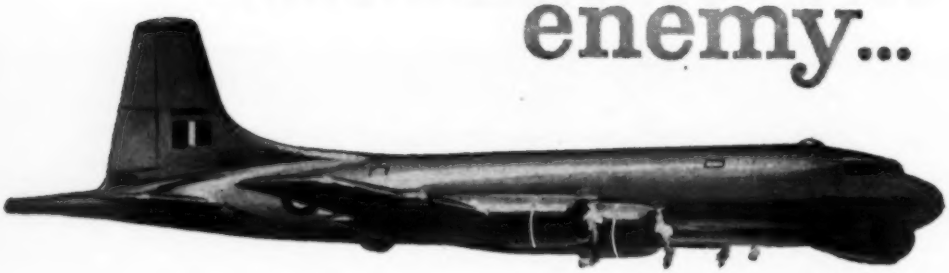
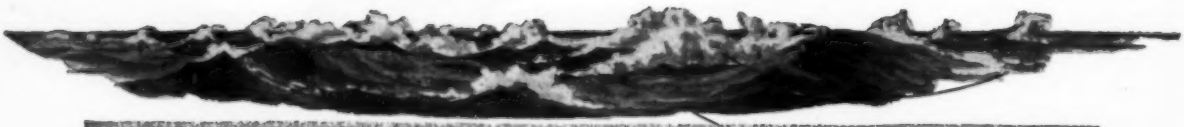
To seek the hidden enemy...





Soon, the oceans around Canada will be patrolled by the first aircraft developed specifically for Canadian maritime reconnaissance duties . . . the Canadair-designed CL-28.

Developed from the Bristol Britannia class by Canadair, this is the largest aircraft ever to be manufactured in Canada and we at Canadair regard it as a tribute to our capabilities that the RCAF selected us to do the job.

Size, of course, is not the only factor, for we are equally at home in the design and production of jet fighters, training planes, airliners, guided missiles or even components for other aircraft. What counts most is our outstanding record for cost performance, on-time deliveries and quality of manufacture.

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CANADAIR HAS PRODUCED MORE JET AIRCRAFT THAN ANY OTHER CANADIAN MANUFACTURER

ACTA's total membership dropped to 26 carriers with 69 planes and IMATA's membership increased to 12 carriers with about 50 aircraft.

But six of ACTA's remaining 26 members are not currently operating. And only nine of the remaining 20 have been recommended for continued operating rights by the CAB staff. Final decision on those recommendations will be made by CAB at some future date in the litigation-riddled Large Irregular Air Carrier Investigation.

• **IMATA, meanwhile,** has its entire membership in the operating category, although one—Purdue Aeronautics—is not a supplemental carrier, as are all other members. Nine of its remaining 11 members, as stated, have favorable CAB staff recommendations.

The group which bolted ACTA and joined IMATA says several other lines are on the verge of similarly transferring their memberships. ACTA's new chairman, Cox, however, said his group definitely does not expect to lose any more members. ◈◈◈

NAL Names Sternberg, Two Others VPs

Walter Sternberg has been named to the new post of vice president-planning of National Airlines.

Sternberg, who has been in aviation since 1930, had previously been with NAL in the 1949-53 period. During the past two years he was an avia- lose any more members. ◈◈◈

Also named vice presidents of NAL were H. K. Pike, maintenance and engineering, and L. W. Dymond, operations. Both had been assistant vice presidents since April, 1955.

Capital, Varig Order Bendix Radar Systems

Two new orders by airlines for airborne weather radar equipment were recorded recently as Capital Airlines and Varig, Brazilian airline, purchased C-Band radar systems from Bendix Radio Division.

Radar ordered by Capital, involving single-indicator, C-Band units, is for installation in Vickers Viscounts. Varig will fit the new radar systems into present Lockheed 1049Gs and in 1649As to be delivered next year.

Summary of U.S. Domestic Airline Revenues and Expenses for Quarter Ended Sept. 30, 1956 vs. Quarter Ended Sept. 30, 1955

Compiled by American Aviation Publications from Official C.A.B. Data.

Airlines	Total Operating Revenues 1956	1955	% Change	Passenger Revenues 1956	1955	% Change	Total Operating Expenses 1956	1955	% Change	Net Operating Income 1956	1955	% Change
DOMESTIC												
American	$ 75,500,779	$ 68,557,675	10.1	$ 67,907,960	$ 61,441,033	10.5	$ 63,402,661	$ 56,250,455	12.7	$12,098,118	$12,307,220	—1.7
Braniff	11,124,567	10,126,324	9.9	10,159,507	9,253,816	9.8	10,435,254	9,141,506	14.2	689,313	984,818	—30.0
Capital	17,357,738	14,087,520	23.2	16,341,395	12,858,232	27.1	17,940,207	12,838,141	39.7	—582,469	1,249,379	...
Caribar	375,001	308,993	21.4	332,489	278,153	19.5	333,157	312,493	6.6	41,844	—3,500	...
Continental	4,737,923	4,423,908	7.1	4,267,721	3,813,194	11.9	4,331,847	4,153,968	4.3	406,076	269,940	50.4
Delta	15,936,851	13,653,800	16.7	14,545,526	12,397,786	17.3	15,079,016	12,149,812	24.1	857,835	1,503,988	—43.0
Eastern	48,941,288	42,752,558	14.5	45,808,615	39,474,935	16.0	47,122,779	39,676,724	18.8	1,818,509	3,075,834	—40.9
Hawaiian	1,583,271	1,494,436	5.9	1,300,590	1,197,646	8.6	1,381,145	1,420,145	—2.7	202,126	74,291	172.1
National	10,361,763	9,787,991	5.9	9,252,575	8,785,640	5.3	9,624,639	8,883,573	8.3	737,124	904,418	—18.5
Northeast	3,357,025	3,479,200	—3.5	2,927,719	3,098,013	—5.5	3,040,616	2,970,745	2.4	316,409	508,455	—37.8
Northwest	14,606,065	15,435,488	—5.4	13,232,908	14,075,922	—5.9	12,374,253	12,033,674	2.8	2,231,812	3,401,814	—34.4
Trans-Pac.	712,588	596,082	19.5	651,807	574,365	13.5	630,374	552,320	14.1	82,214	43,762	87.9
TWA	47,773,665	44,338,072	7.7	44,013,513	40,500,700	8.1	45,369,398	39,049,230	16.2	2,404,267	5,288,842	—54.5
United	69,654,281	63,578,746	9.6	61,904,136	56,385,706	9.8	58,394,614	52,487,902	11.3	11,259,667	11,090,844	1.5
Western	9,622,711	8,817,587	9.1	9,039,149	8,272,145	9.3	7,790,299	6,818,655	14.2	1,832,412	1,998,932	—8.3
TOTALS	$331,645,516	$303,676,833	9.2	$301,685,610	$274,479,149	9.9	$297,250,259	$260,835,945	14.0	$34,395,257	$42,840,888	—19.7
INTERNATIONAL												
American	$ 1,640,618	$ 1,468,616	11.7	$ 1,353,643	$ 1,251,628	8.2	$ 1,332,760	$ 1,104,882	20.6	$ 307,858	$ 363,734	—15.4
Braniff	1,998,597	1,557,635	28.3	1,459,200	1,559,998	—6.5	1,588,356	1,990,385	—20.2	410,241	—432,750	...
Delta	1,397,601	1,196,813	16.8	1,294,106	1,094,917	18.1	1,148,449	1,217,701	—5.7	249,152	—20,888	...
Eastern	4,543,976	3,050,489	48.9	4,172,305	2,704,725	54.3	3,429,617	2,035,270	68.5	1,114,359	1,015,219	9.8
National	799,778	995,242	—19.6	747,590	926,321	—19.3	930,614	931,124	—0.1	—130,836	64,118	...
Northwest	7,261,536	6,209,532	16.9	4,663,083	4,028,204	15.8	5,970,837	5,740,650	4.0	1,290,699	468,882	175.3
Panagra	5,030,136	4,546,285	10.6	3,823,419	3,593,024	6.4	4,630,110	4,348,258	6.5	400,026	198,027	102.0
Pan American												
Lat. Amer.	23,785,554	15,859,252	49.9	17,479,554	15,390,351	13.6	21,496,858	18,510,208	16.1	2,288,696	—2,650,956	...
Atlantic	39,248,861	32,808,558	19.6	33,242,900	27,194,163	22.2	30,897,966	26,156,981	18.1	8,350,895	6,651,577	25.5
Pacific	19,541,815	13,787,299	41.7	14,879,772	12,284,254	21.1	15,993,782	13,965,694	14.5	3,548,033	—178,395	...
Alaska	2,251,525	2,426,208	—7.2	1,506,518	1,451,301	3.8	2,182,768	1,948,911	11.9	68,757	477,297	—85.6
TWA	21,646,004	20,061,026	7.9	18,225,251	16,801,597	8.5	17,888,489	16,073,472	11.3	3,757,515	3,987,554	—5.8
United	4,273,559	4,106,804	4.1	4,095,198	3,901,193	5.0	3,018,762	2,898,833	4.1	1,254,797	1,207,971	3.9
TOTALS	$133,419,560	$108,556,590	22.9	$106,942,539	$ 92,630,979	15.5	$110,509,368	$ 97,319,192	13.6	$22,910,192	$11,237,398	103.9
LOCAL SERVICE												
Allegheny	$ 1,796,940	$ 1,663,990	7.9	$ 1,300,465	$ 1,194,599	8.9	$ 1,864,357	$ 1,681,292	10.9	$ —67,417	$ —17,302	...
Bonanza	776,209	659,790	17.6	416,444	357,021	16.6	736,273	658,728	11.8	39,936	1,062	3660.5
Central	862,607	720,017	19.8	305,070	207,985	46.7	838,095	746,597	12.3	24,512	—26,580	...
Frontier	1,582,419	1,357,482	16.5	824,390	737,454	11.8	1,529,642	1,387,718	10.2	52,777	—30,236	...
Lake Central	709,746	722,155	—1.7	349,852	323,553	8.1	705,513	703,962	0.2	4,233	18,193	—76.7
Mohawk	1,389,930	1,165,161	19.3	1,123,777	984,988	14.1	1,547,262	1,213,703	27.5	—157,332	—48,542	...
North Central	2,229,945	1,956,735	14.0	1,845,550	1,617,499	14.1	2,161,236	1,868,167	15.7	68,709	88,568	—22.4
Ozark	1,482,632	1,082,016	37.0	850,141	646,638	31.5	1,619,809	1,134,069	42.8	—137,177	—52,053	...
Piedmont	2,138,430	1,683,897	26.9	1,337,337	1,210,439	10.5	2,022,256	1,669,010	21.2	116,174	14,887	680.3
Southern	972,815	917,377	6.0	503,741	434,348	15.9	1,021,598	897,940	13.8	—48,783	19,437	...
Southwest	1,479,013	1,230,911	20.2	885,687	819,240	8.1	1,337,533	1,078,305	24.0	141,480	152,606	—7.3
Trans-Texas	1,467,160	1,238,613	18.5	805,011	548,929	46.7	1,582,526	1,176,269	34.5	—115,366	62,344	...
West Coast	1,053,780	1,014,257	3.9	596,681	584,592	2.1	958,317	959,238	—0.1	95,463	55,019	73.5
TOTALS	$ 17,941,626	$ 15,412,401	16.4	$ 11,144,146	$ 9,667,285	15.3	$ 17,924,417	$ 15,174,998	18.1	$ 17,209	$ 237,403	—2.8
HELICOPTER SERVICE												
CHI Helicopter	$ 128,041	$ 132,595	—3.4	.....	.....	...	$ 133,997	$ 113,730	17.8	$ —5,956	$ 18,865	...
Los Angeles	261,685	276,635	—5.4	$ 36,537	$ 10,827	237.5	282,629	231,973	21.8	—20,944	44,662	...
N. Y. Airways	443,178	462,536	—4.2	87,987	54,859	60.4	482,878	380,318	26.9	—39,700	82,218	...
TOTALS	$ 832,904	$ 871,763	—4.5	$ 124,524	$ 65,686	89.6	$ 899,504	$ 726,021	23.9	$ —66,600	$ 145,745	...

Carter Burgess, TWA's New President Is Expert in Planning, Administration

Carter L. Burgess, who will take over presidency of Trans World Airlines early next year, can be expected to place major emphasis on planning and administration, fields in which he has concentrated during the past several years.

Burgess, who resigned earlier this month as Assistant Secretary of Defense for Manpower, Personnel and Reserve, had been active in projects involving organization of government departments and of the White House staff. In accepting his resignation, President Eisenhower praised him highly for the able and respected guidance you have offered throughout the range of Armed Forces personnel management . . ."

BURGESS

• **The new president,** who will be 40 Dec. 31, will be the youngest head of a trunkline. His resignation from the Defense Department is to be effective no later than Feb. 1 and he will assume his duties as TWA's chief executive, director and member of the executive committee early in the year "following completion of government projects in which he is currently engaged." Announcement was made by Howard Hughes, TWA's majority stockholder.

TWA had been without a president since the death of Ralph S. Damon on Jan. 4, 1956. John Collings, executive v.p., has been acting chief executive and is credited with doing an outstanding job of operating the company during the past 11 months.

Burgess, who was with TWA for about a year in the 1946-47 period, is a native of Roanoke, Va., and a graduate of Virginia Military Institute. Before World War II he was associated with Liberty Mutual Insurance Co. in Boston and with Stone Printing and Manufacturing Co., Roanoke.

• **During four years** of Army service he attained the rank of colonel. He was secretary of the General Staff for SHAEF and served as administrative secretary to the Casablanca Conference in 1943.

In 1946-47 he was assistant to Jack Frye, then president of TWA. From 1947 to 1953, when Frye was president of General Aniline & Film Corp., Burgess was with that company as assistant to the president, assistant v.p. in charge of divisional operations, and director of administration.

In 1953 he became assistant to the president of the University of South Carolina and later served as executive v.p. of the Citadel Life Insurance Co. Also in 1953 he was consultant to the Undersecretary of State on staff organization, consultant to President Eisenhower on White House staff organization, consultant to the Senate Armed Services Committee, and acting staff director of the Secretary of Defense's committee on fiscal organization.

In 1954, Burgess served as director of the Secretary of State's public committee on personnel. He was sworn in as an Assistant Defense Secretary on Sept. 24, 1954.

What Russians Have Learned About Jet Transport Operations with Tu-104

Russia's first two months of scheduled service with 50-passenger Tu-104 jet transports have turned up a number of operational problems ranging from small to serious.

The USSR's Civil Air Fleet Administration (Aeroflot), in warning that maintenance of jet schedules will be considerably more difficult with the onset of sub-zero cold and long nights throughout much of the nation, emphasized these points:

• Failure to complete projects for paving runways, taxi strips, aprons and servicing facilities, plus delays in installing improved landing aids, are causing concern, especially on the trans-Siberian route.

• Conditions at Irkutsk, temporarily the eastern terminus of Aeroflot's trans-Siberian jet flights, are a particular headache. (The director of Irkutsk's airport construction work has been publicly criticized because a new landing system and taxi strips, badly needed for Tu-104 operations under severe mid-Siberian winter weather conditions, are not finished.)

• Airport projects at Omsk, intermediate point on the Moscow-Irkutsk run, are also behind schedule.

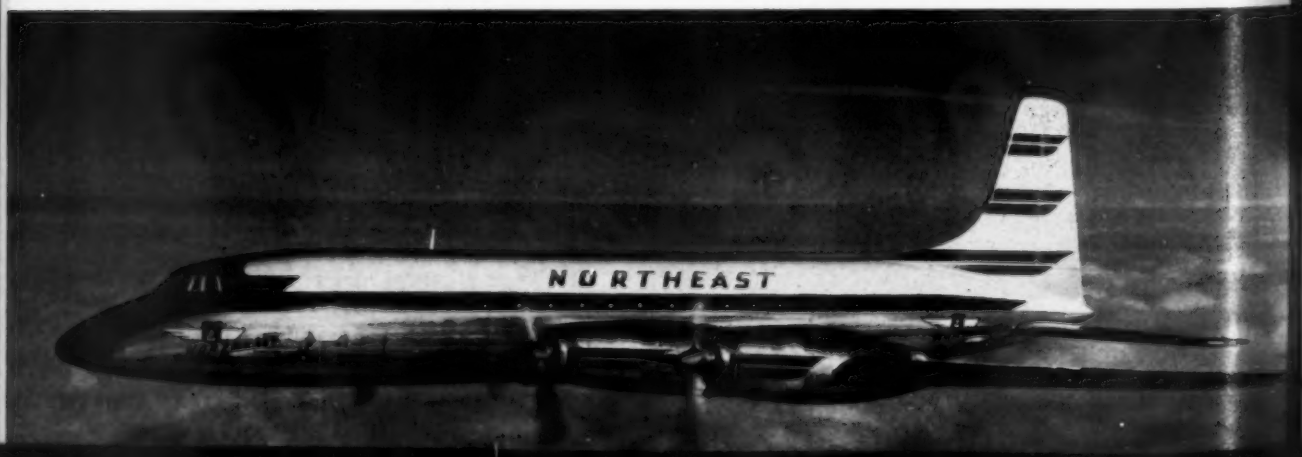
• Publication and distribution of Tu-104 technical manuals have not kept pace with requirements.

• Flight crews must learn to reduce maneuvering time in the air prior to final landing approach.

• Lack of mechanized equipment for baggage loading and unloading—

Britannia in Northeast Airlines Markings

Northeast Airlines has ordered five Bristol Britannia 305s for delivery next fall at a cost of more than $17 million. First three will be delivered in October, remaining two in November, in time for introduction on Northeast's new route extension from New England/New York to Florida for the 1957-58 winter season. Another new Britannia order came from Hunting-Clan Air Transport, British independent, for two 310LRs for delivery in May 1958 with an option on a third aircraft. Total number of Britannias sold to date is 62.



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unnecessary for Aeroflot's small-capacity piston-engine aircraft—delays departures.

• Delivery of new towing tractors, fuel tank trucks, ramp electrical apparatus, special measuring instruments, low-pressure cabin test compressors, etc., to airports used by Tu-104s must be speeded up to alleviate existing shortages.

Inefficient provisioning of Tu-104s and poor organization of in-flight service of hot meals have also been criticized.

On the other hand, Aeroflot boasts that not one Tu-104 schedule was disrupted for mechanical reasons during the jets' first month of operations. "Already," it declared, "the Tu-104 has made a fine record for reliability."

Contributing to this performance is the fact that some of the carrier's top mechanics have been assigned to the new planes after completing a special jet maintenance school.

Russia started regular Tu-104 service on September 15 after conducting test and training flights over several Aeroflot routes since May. Domestic operations now include Moscow to Irkutsk in central Siberia, Moscow to Tbilisi in the Caucasus, and Moscow to Tashkent in south-central Asia.

Scheduled international service between Moscow and Prague began on October 12. ◈ ◈ ◈

Maintenance and Overhaul Facilities In Russia Lagging, Aeroflot Admits

Russia's Aeroflot sees disturbing indications that its maintenance and overhaul facilities are not keeping pace with recent fast growth in the nation's civil transport fleet.

Stepped-up deliveries of piston-engine Il-14s, combined with the introduction of Tu-104s into scheduled service, has placed a record work load on the Soviet carrier's repair bases. During the first nine months of 1956, Aeroflot's overall traffic (in ton-kilometers) ran about 15% ahead of 1955, but construction of new hangars and shops lagged.

Last summer, when weather conditions were conducive to outside work, Aeroflot's maintenance crews exceeded their quotas on a system-wide basis. However, effects of the developing pinch in enclosed servicing space may become serious this winter, according to Russian reports.

• **Grazhdanskaya Aviatsiya**, Aeroflot's official organ, says that reorganization of maintenance and overhaul work to meet the needs of more and larger aircraft "is being accomplished very slowly." It places much of the blame on administrators who showed "a negative attitude" toward proposals designed to increase efficiency.

Five years ago, the magazine asserted, an Aeroflot foreman suggested construction of permanent, fully-equipped aircraft docks to replace and improve upon some of the temporary enclosures used in engine maintenance. "Unfortunately," *Grazhdanskaya Aviatsiya* went on, "this valuable proposal was treated formally and rejected without proper consideration. About the same time, foreign aviation magazines began publishing plans and descriptions of similar docks.

"Now, however, our leading engineering and technical personnel see clearly that it is high time to get rid of outmoded work methods. We must stop trying to adapt practices used in servicing small planes to present-day transports.

"We must stop losing time in moving ladders, hoists, work benches and other equipment to the parking place of each plane that arrives at an overhaul base. Instead, we must use the progressive method of bringing the aircraft to a fully-equipped work area."

Aeroflot has shown considerable interest in an enclosed dock designed by one of its repair base engineers, identified only as Comrade A. G. Epshtein. This dock (see drawing) accommodates the Russian airline's three basic types of twin-engine piston transports—Li-2, Il-12 and Il-14.

The collapsible structure provides cover for a plane's nose section and engines. It encloses about 17,650 cu. ft. and has a span of 50 ft.

A winch is used to haul the aircraft into the dock. Overhead monorails are provided to remove engines from the building and load on trucks outside.

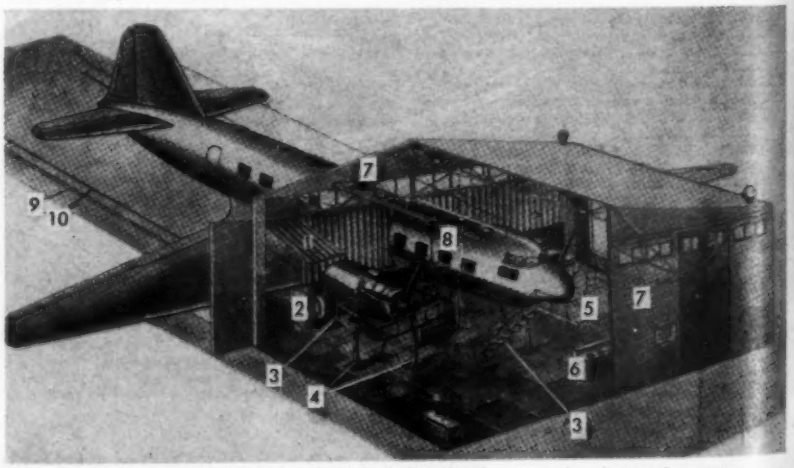
Plans for larger versions of Epshtein's dock are being studied. These structures would provide cover for mechanics working on the undercarriage and central section of the wing and for those working on engines and nose.

Aeroflot has also disclosed plans for installing efficient, fully-equipped work platforms in its standardized docks. Designs being considered very closely resemble equipment row in wide scale use by major U.S. carriers. This setup (see sketch) would eliminate the need for large numbers of special scaffolds suited to only one type of plane.

• **Main part of the work area** (into which the plane is pulled by winch and cable) is a stationary platform about 4 ft. 4 in. above the floor. It contains mechanics' benches, propeller stands, fume hoods for washing parts, instrument and parts racks, greasing equipment, etc., for each engine. Propellers, engines and heavy parts are removed and suspended by fixtures operating on monorails.

Another stationary platform is located in front of the docked plane's nose. It is 7 ft. 6 in. above the floor and about 3 ft. 4 in. higher than the fixed platforms on either side with which it is connected by stairs. This front platform has work benches, together with racks for parts required in servicing the nose section and instrument panel.

Aeroflot estimates that with proper organization and a two-shift work schedule, one such dock can provide the necessary maintenance for 20 highly-utilized Il-12s. ◈ ◈ ◈



Russian engineer A. G. Epshtein has developed this plan for an enclosed aircraft maintenance, repair and overhaul dock capable of accommodating Soviet twin-engine transports. Indicated features of the structure are: 1—swinging panel; 2—stationary bulkhead for suspending aircraft; 3—retractable servicing platforms; 4—fixed lifts for servicing platforms; 5—balcony for servicing nose cone section; 6—control panel for plane-towing mechanism; 7—monorails for moving engines; 8—suspension fixture; 9—guide flange; 10—groove for towing mechanism cable.

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Airline Commentary

By Eric Bramley

When the shooting started in the Middle East, TWA employes were evacuated from Cairo as fast as possible. Some went to Alexandria and boarded ships. The last group made its way via motor convoy (some 20 grueling hours) to Tobruk, Libya, where a special TWA Connie picked them up. In the party was Emmet Riordan, public relations manager for the Middle and Far East. When he reached Rome he sent the following cable to his boss, Gordon Gilmore, v.p.-public relations in New York: "Reference Exodus 16/6." Gilmore referred to the Bible and got his answer from Exodus, Chapter 16, Verse 6: "You will know that it was the Lord Who brought you out of the land of Egypt."

• • •

This is the time of year when airlines serving Florida are plagued by multiple reservations—when slick operators book themselves on almost every southbound flight to make sure they'll have seats when they want them. Of course they never bother to cancel unused space, and the result is hundreds of empty seats. But it looks like National Airlines may have put the crusher on them. Its been using an IBM machine to check both elapsed ticket time limits and multiple reservations. In one four-day period, for example, the machine turned up 405 duplicate reservations plus hundreds of expired time limits. Space was sold to wait-list customers. More power to NAL.

• • •

A tip of the hat this month to *Aeronautics*, British magazine which consistently comes up with some of the brightest picture captions found anywhere. In the November issue a caption describes the managing director of Bristol Aircraft as "turboprophet Peter Masefield." This, we believe, is a new jet-age word. Same issue also describes a jet pilot as a "thrust-taster." Congratulations to Editor Oliver Stewart.

• • •

Odds and ends: Allegheny Airlines' French hostesses, who were to fly on the company's Martins for six months (starting last June), have done such a good job that their stay has been extended for another half-year . . . Seaboard & Western Airlines recently carried eight tons of French perfume (retail value of $6 million) on one flight across the Atlantic to New York. Good thing the pilot didn't make a hard landing and bust up the shipment. Idlewild would have smelled of "My Sin" for weeks . . .

Sales, Traffic, Promotion

University of Michigan national travel market survey shows that three out of every four adults have never taken an air trip, half have never been more than 100 miles on a bus, and 30% have never taken a rail trip. All but 11% have traveled 100 miles or more in a car. Vacations and pleasure travel account for nearly two-thirds of all trips of 100 miles or more. About three out of four adults with annual incomes of $15,000 or more have taken an air trip, compared to one in 10 among those making $3,000 or less. However, the $5,000-to-$10,000 income group accounts for 35% of all air travel. Thirty percent of those who have ever taken a trip cite cost as a disadvantage of air travel. The Michigan study was financed by the New York Central Railroad and the Port of New York Authority. . .

Pan American World Airways will sponsor all nine of the Edward R. Murrow-Fred W. Friendly "See It Now" programs planned for the 1957 season. . .

TWA's national newspaper advertising is now featuring the flying experience, personalities and background of its pilots. Theme of the campaign is "fly with the pilots who fly the world." First captain featured was Bob Buck. . . TWA is now issuing vest-pocket size "memo" timetables for customers interested in a single destination. They're available at 10 districts in the U.S. Others cover flights out of New York for London, Frankfurt, Paris and Rome. . .

George Braender, U.S. sales manager for **Varig Airlines** of Brazil, is a prolific user of gimmicks that are effective in calling attention to his company. He's now sending 1,500 travel agents a "gift of the month" through Brown & Bigelow. Gifts range from plastic shoehorns to egg separators and key rings. . .

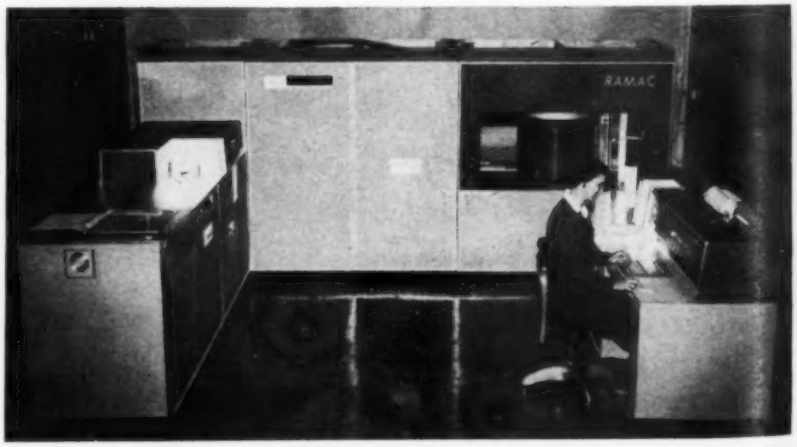
Northeast Airlines sales personnel have been wearing big links of chain in their lapels. People whose curiosity gets the best of them are handed a booklet, "Another Link in a Chain Reaction," explaining that the new route to Florida is "another important air link between the north and south". . .

Braniff Airways' 1957 sales goal is $66,088,000. . . Hot Shoppes Inc., Washington, D.C., restaurant and catering chain, has opened a facility in Dallas and is handling Braniff's meal service out of that city (about 1,000 meals daily). . .

TWA is now brewing coffee on its Super-G Constellations. Company says it's using a newly-perfected electronic coffee maker, a product of Huggins-Young Coffee Co., Los Angeles. The device is connected directly with the hot-water system of the Super-G. Elimination of the old thermos jugs is a money-saver; maintenance on jugs was costly. Also, weight saving is considerable. Passengers like the fresh coffee. An average of 260 cups is being served on a typical Los Angeles-New York nonstop carrying 50 people, compared with 190 cups of the former thermos jug coffee that was made on the ground. . .

Swissair is distributing to travel agents copies of a new booklet, "Which of these Is You?" designed to help them sell the fly now-pay later plan. Booklet contains a series of endorsements of the company's time pay plan. . .Swissair has bought 30 kennels for transportation of pets. They're available for rental on all flights for $3.50. . .

Continental Air Lines opened a temporary sales office at 116 S. Michigan Ave., Chicago. Company is completing negotiations for a permanent office on "airline row" near Monroe and Wabash after the first of the year . . . Pan American opened a ticket office in the Fulton National Bank Bldg., Atlanta, Ga. . .



An electronic brain that can retain 5 million units of information will be placed in service by United Air Lines next fall to "memorize" all flight reservations on the UAL system. The machine is RAMAC (Random Access Memory Accounting) built by IBM, and UAL says this will mark its first use in the transportation industry. It will be used at UAL's customer service center in Denver to keep running inventory of reservations on each of 300 daily flights for consecutive periods of 100 days. Compared with the company's present method, RAMAC will reduce processing time by at least 60%. The 5 million units of information are stored on the stack of disks immediately behind the operator.

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New York Schedules		
Lv. New York (EST)	9:30 am	12:30 am
Ar. Los Angeles (PST)	3:15 pm	6:15 am
Los Angeles Schedules		
Lv. Los Angeles (PST)	8:30 am	8:30 pm
Ar. New York (EST)	6:45 pm	6:45 am
Lv. Los Angeles (PST)	8:45 pm	
Ar. Washington (EST)	6:45 am	
Washington Schedules		
Lv. Washington (EST)	9:30 am	
Ar. Los Angeles (PST)	2:45 pm	

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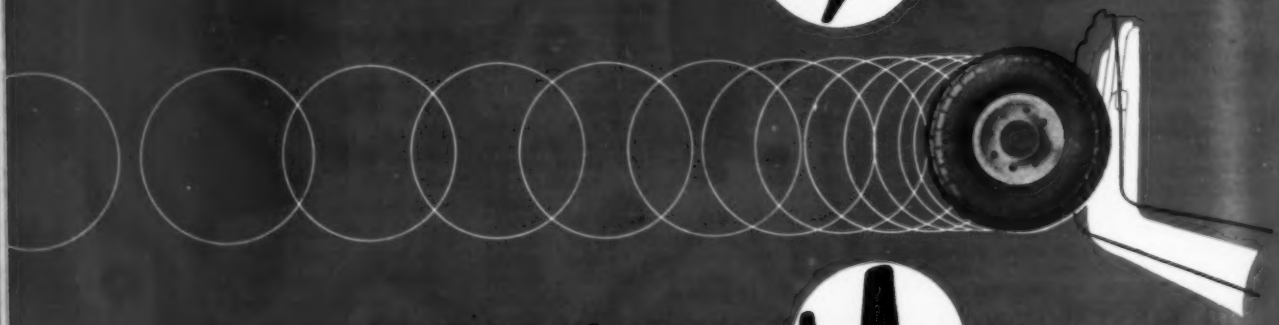

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Contracts

The following USAF contracts were announced by the Commerce Department:

Allison Div., General Motors Corp., Indianapolis, Ind., $17,257,390, T56 turboprop engines for C-130s; $2,446,600, modification of J33 engines for Martin TM-61 Matador missiles.

Lycoming Div., Avco Mfg. Corp., Stratford, Conn., $2,900,000, pre-production work on T53 engine, and $1,140,000, product improvement on T53.

AC Sparkplug Div., General Motors, Flint, Mich., $1,156,322, tracking computers and indicators for B-47 and B-52 aircraft.

Continental Motors Corp., Muskegon, Mich., $200,593 and $1,016,673, Packette engines and spares.

International Business Machines Corp., New York, $9,870,000, bombing navigational systems for B-52.

Hayes Aircraft Corp., Birmingham, Ala., $713,000 and $400,000, modification of various B-50 configurations; $1,500,000, IRAN and modification of C-119s, and $2,255,560, IRAN of B-25s.

Pacific Airmotive Corp., Burbank, Calif., $5,494,256, IRAN of C-47 and C-117 aircraft; $750,000, IRAN of F-86A/E and F-86F aircraft.

Temco Aircraft Corp., Greenville, Tex., $2,937,675, IRAN and electronic modification of C-54 aircraft.

Collins Radio Co., Cedar Rapids, Ia., $1,299,098, vertical gyros, course indicators and components.

Boeing Airplane Co., Seattle, $4,706,000, facilities for B-52 production and testing.

Flight Enterprises Inc., Windsor Locks, Conn., $3,670,719, drop-in maintenance for C-118As.

Aircraft Engineering & Maintenance Co., Oakland, Calif., $2,295,000, IRAN for T-33s.

Grand Central Aircraft Co., Glendale, Calif., $2,510,712, IRAN of C-45G/H aircraft.

Shaw & Estes, Dallas, $2,146,032, jet engine test stands.

Lockheed Aircraft Service Inc., Ontario, Calif., $1,677,031, maintenance of R-7V-1 aircraft.

Following contracts were announced by Air Materiel Command:

Northrop Aircraft Inc., Hawthorne, Calif., $14,795,758, modification of F-89Ds.

Glenn L. Martin Co., Denver, $10,800,000, facilities for WS-107 ICBM program.

Hughes Aircraft Co., Culver City, Calif., $4,446,594, flight testing.

Hallicrafters Co., Chicago, $2,401,690, electronic countermeasures sets.

Glenn L. Martin Co., Baltimore, $2,594,750, electronic countermeasures sets.

General Electric Co., Utica, N. Y., $2,897,436, transmitters and receivers.

E. I. duPont de Nemours & Co., Wilmington, Del., $2,964,916, methanol.

Collins Radio Co., Cedar Rapids, Ia., $1,245,940, radio sets, spare parts and data.

Talos Overhaul Div., Flight Enterprises, Inc., Windsor Locks, Conn., $3,670,719, maintenance of C-118A aircraft.

Airborne Instruments Laboratory, Mineola, N. Y., $1,596,183, electronic reconnaissance sets.

General Electric Co., Syracuse, N. Y., $2,691,261, operation and maintenance of radar sets.

Aircraft Gas Turbine Div., General Electric, Cincinnati, $2,244,400, technical services; Electronics Div., Syracuse, $2,514,000, technical services.

American Bosch Arma Corp., Hempstead, N. Y., $2,900,000, facilities for WS-107 guidance.

American Machine & Metals Inc., Sellersville, Pa., $1,000,000, parachute release assemblies.

Craig Systems Inc. Danvers, Mass. $2,198,271, communications equipment.

ADVERTISERS' INDEX

AC Spark Plug Division, General Motors Corp. 10
Aero Design & Engineering Company 16
Aerojet-General Corporation, (Sub. of The General Tire & Rubber Co.) ..... 24 & 25
Aircraft Radio Corporation 54
AiResearch Manufacturing Co., Div. of The Garrett Corp. ..... 66 & 67
Allison Division, General Motors Corp. 59
American Airlines, Inc. 89
Bendix Aviation Corporation
Bendix Radio Communications Div. 53
Scintilla Division ..... 37 & 60
Blythe Aircraft Corp. 65
Boeing Airplane Company 63
Bulletin Board (Classified) .....
Canadair Limited, (a Sub. of General Dynamics Corp.) 82
Cee-Bee Chemical Company, Inc. 55
Chandler-Evans 61
Collins Radio Company 72
Continental Aviation & Engineering Corp., Sub. of Continental Motors 36
Continental Motors Corp., Aircraft Engine Division 5
CONVAIR—A Division of General Dynamics Corp. 27
Curtiss-Wright Corp. 23
Douglas Aircraft Co., Inc. 38
Electric Storage Battery Co., The, Exide Industrial Div. 51

EMPLOYMENT SECTION

North American Aviation, Inc., Columbus Division 93
Esso Standard Oil Company 85
B. F. Goodrich Company, The 28
Goodyear Tire & Rubber Company, Inc., The 3
Grumman Aircraft Engineering Corp. 87
Hertz Rent A Car System 77
Hollywood Roosevelt Hotel 65
Hydro-Aire, Inc. 90
Kelsey-Hayes Wheel Company 70
Lear, Inc. 8
Hotel Lexington 50
Lockheed Aircraft Corporation 69
Marman Products Co., Inc. A Sub. of Aeroquip Corp. 21
Martin Company, The 20
Minneapolis-Honeywell Regulator Co., Aeronautical Division 12
Monsanto Chemical Company 17
New York Air Brake Co., The, Watertown Division 13
North American Aviation, Inc. 43
Orenda Engines Limited 1
Pratt & Whitney Aircraft Division, United Aircraft Corp. 4
Radio Corporation of America ..... 48 & 49
Ralph C. Robinson Company 58
Rolls-Royce, Limited 34
Scott Aviation Corporation 11
Seaboard & Western Airlines, Inc. 81
Simmonds Aerocessories, Inc. 41
Southwest Airmotive Company 72
Sperry Gyroscope Co., Div. The Sperry Rand Corp. 57
Stratos, a Div. of Fairchild Engine & Airplane Corp. 95
Stroukoff Aircraft Corp. 52
Texas Company, The 96
Trans World Airlines, Inc. 74
United Air Lines, Inc. 78
Vertol Aircraft Corp. ..... 6 & 7
Vickers-Armstrongs, Ltd. 14
Vickers, Inc., Div. of The Sperry Rand Corp. 44
Watertown Division, New York Air Brake Company, The 13
Weber Aircraft Corp. 47
Wm. R. Whittaker Company 33
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Goma: Beauty Spot of Belgian Congo

If you ever get to the Belgian Congo, let me recommend the town of Goma at the north end of Lake Kivu.

It has such a delightful climate that it can get monotonous, like Hawaii. It's about 4,800 feet altitude and only a few hundred miles south of the equator. The sun rises at 6 a.m. and sets at 6 p.m. every day. The lake is blue and stretches irregularly 150 miles to the south. To the north are volcanoes, several of which are always smoking. To the immediate east is Ruanda-Ruindi, once a German territory and now governed by the Belgians under a U.N. trusteeship.

What a relief it was to pull into this clean little town with its numerous fine houses and some paved streets (which we hadn't seen for a long time) and some stores that looked like stores, and drive up to a clean modern-looking hotel with a brisk fountain and garden in front.

Let me give a real orchid to the Hotel des Grand Lacs. It's first class, well built and well equipped. The rooms are excellent. It even has green plumbing fixtures in the bathrooms (yes, you bidet fans, nice green ones). Lots of hot water, lots of electricity with no "lights-off" at 10 p.m. There are two bars, one for summer and one for winter, both well equipped. There is an excellent wine cellar, a fine dining room, some lounges, a coffee room, and so on. It was a pleasant surprise to find such an excellent place far back in the Congo. (Proprietors of those northern camps, take note!)

Social Life Surprises

Our Sabena press party was honored at a dinner that would have won high honors in New York. Never did I expect to go to a social affair in the Congo where women were wearing fine evening dresses, hairdos, furs and jewels. In advance there was a cocktail party and our host, a local citizen quite proud of his part in developing Goma, gave out slips of paper on which was a seating plan of the table for thirty with the name of each guest written in.

I don't know how many courses there were, but it was a full dinner complete with a different wine for each course. There were flowers on the table, the silver service was top-flight, the service good, and the conversation was lively, mostly in English but some in French. In addition to Americans and Belgians there were a few other nationalities represented. I had to keep reminding myself that I was in the African Congo.

A belle of the Congo suitably decked out in straw finery on her way to a market poses with WWP.

There are about 800 Europeans in the Goma area, a rather cosmopolitan group, and before the evening was over we had picked up smatterings of the local scene, such as the usual gossip about swapping wives, mistresses, the activities of widows, minor scandals, and all that sort of thing.

Goma has regular air service and gets its best food from Europe. There is frozen trout flown down in plastic bags, lobster tails flown in from South Africa, and numerous other specialties. The local stores seem to be well supplied. Life is better at Goma than any other similar place I've seen.

But there's another spot besides the Hotel des Grand Lacs that is worth considering. It has a lot of local charm and is a very good place to stay. It's the Bugoyi Guest House in Kisenyi, the capital of Ruanda-Ruindi just a couple of short miles away. The two towns adjoin each other. The Bugoyi Guest House is owned by a White Russian woman who lives in New York, but is managed by a fine young Dutch couple who visited the area some years ago and liked it so much they wanted to settle down there. They persuaded the owner to let them run the hotel and the arrangement has worked out well for both parties.

We went to the guest house for a cocktail party and found it to have an excellent bar and fine atmosphere. Staying there and having just arrived from Kenya were Armand Dennis and his wife who are making films for the British TV. It would be a difficult decision as to which hotel to stay in next time; I liked them both.

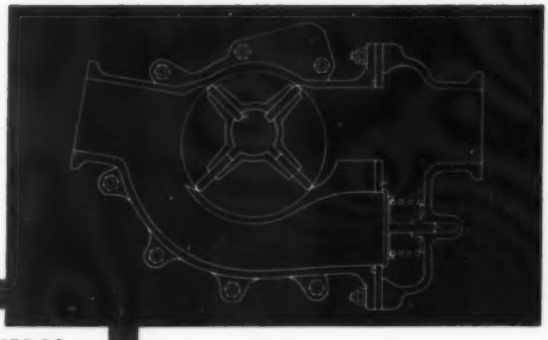
Watutsi Dancers Intriguing

One big reason for our going to Goma in the first place was to see the Watutsi dancers, who are now rather famous and have been well filmed many times. The Watutsi tribe are the chief occupants of Ruanda-Ruindi, which is a very hilly country with cattle as the primary pursuit. The Watutsi are aristocrats and very lean and tall, averaging six feet in height. There used to be many who were over seven feet high. The really tall gents are becoming pretty scarce.

Originally the Watutsi came from Ethiopia and upper Egypt. They have long faces, regular features, aquiline noses, thin lips, small joints, narrow shoulders, and long and slender limbs. They excel in dancing and high jumping.

The Watutsi wear Musselman robes and are Arabized. They were converted to Islam and adopted Arab ways. Some of the men are very handsome indeed. They look patriarchal, or like figures out of the Bible.

They are excellent dancers. The dancing team we saw outside Kisenyi was said to be about second rate, but they put on a good performance. To my taste, however, the Watutsi have become a little too commercialized. To see a real old-fashioned dancing performance you've got to go by dusty, tortuous road back into the hinterland. Some day I'd like to see something more of Ruanda-Ruindi; it's still a very primitive but very colorful part of Central Africa. One thing is certain: The Watutsi are entirely different from the Congo natives.



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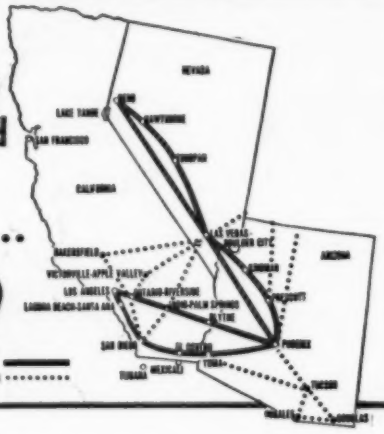

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